

Railway Age

WITH WHICH IS INCORPORATED THE RAILWAY REVIEW

FIRST HALF OF 1927—No. 4

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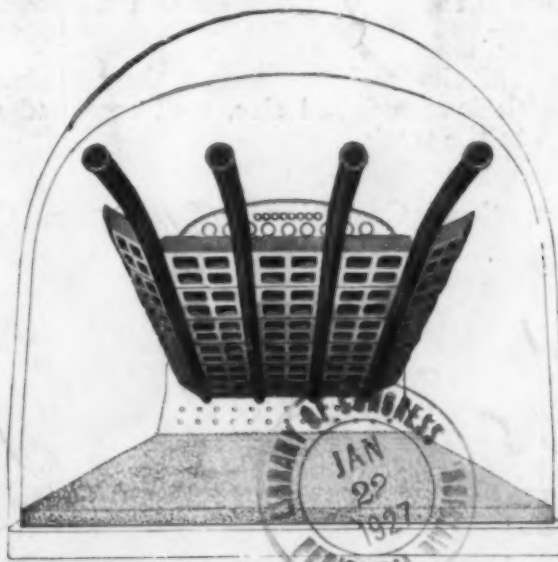
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Railway Age

Vol. 82 January 22, 1927 No. 4

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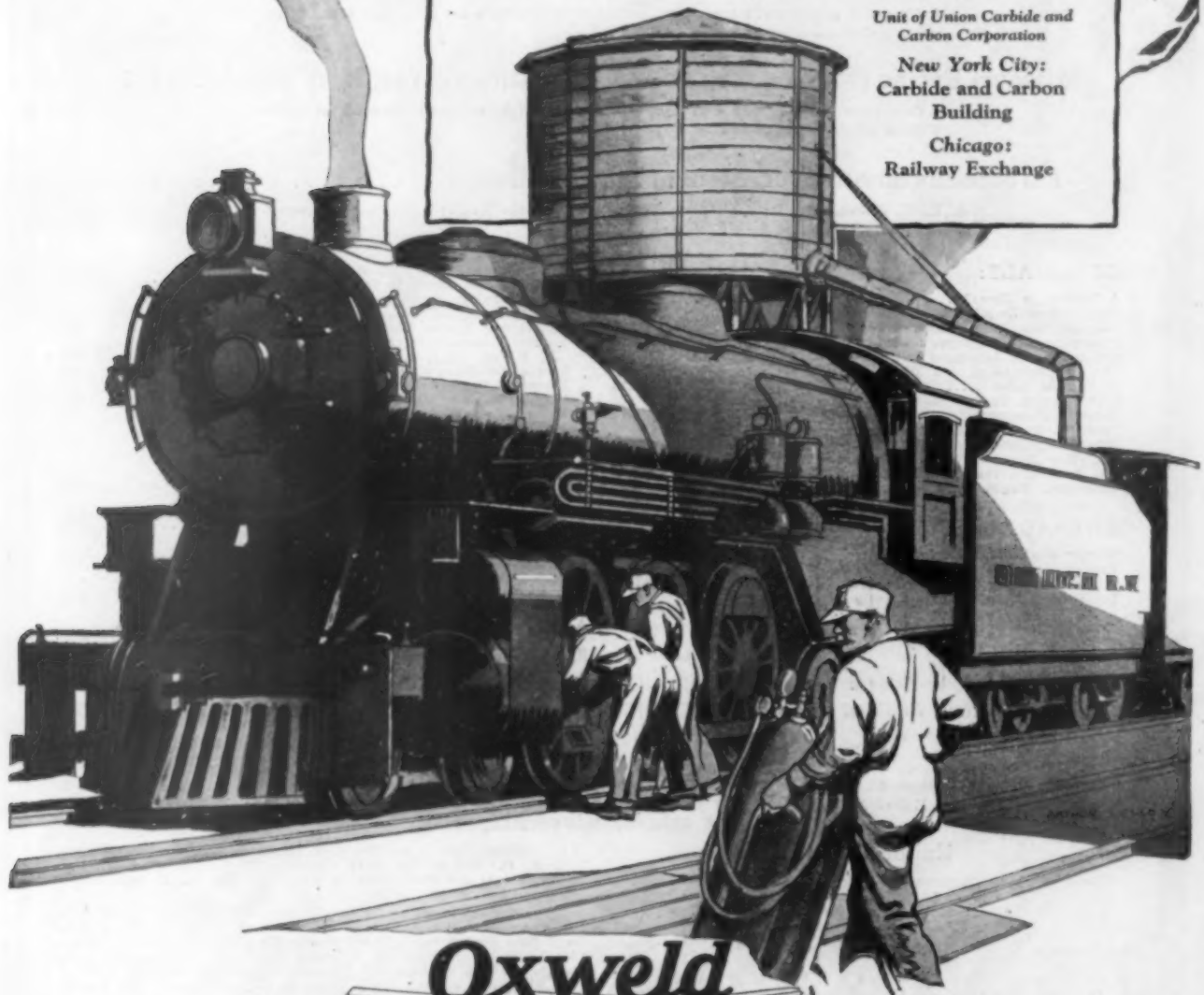
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Railway Age

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A Return to Force?

NOBODY profits from a railroad strike—the employees, the owners and the public all suffer. This is quite generally admitted by all concerned. Considering the spirit in which the Watson-Parker Act was accepted by the labor unions and the railroad managements is it not strange that the trainmen and conductors in the southeast are taking a strike vote to reinforce their negotiations for an increase in wages? On what possible basis can such action be justified?

Signals Save 30 Minutes on 95 Miles

THE criticism is often advanced that the savings produced by automatic signals are too intangible. Therefore, a report received recently from a railroad officer may be offered as specific evidence of the benefits, stated in terms grasped readily. A part of this report mentions a 95-mile installation of automatic signals completed last summer on which a check shows that almost every freight train run over the territory saves from 30 minutes to three hours as compared with the time that was required under the manual block system, notwithstanding that the manual block rules provided for a permissive movement of following freight trains and that trains of all classes were permitted to proceed in the same direction by manual block signals whose indications superseded time-table superiority.

Does the Rebuilt Locomotive Pay?

THE rebuilding of obsolete motive power to adapt it for modern service requirements is a highly desirable objective, but anticipated economies may not always result unless every phase of the reconstruction program is worked out with the greatest care and possible difficulties anticipated. An example of what may be encountered is afforded by the case of a locomotive to which superheat was applied and certain other changes made, affording a net increase of three per cent in tractive effort. A study of the service of this rebuilt locomotive showed that its cost of maintenance increased at once from 27.3 to 40.3 cents per mile, or nearly 48 per cent, because the greater sustained tractive effort caused excessive wear of the driving and running gear and prevented getting the desired mileage between driving box and rod bushing renewals. If the ratio of heating surface to grate area is high in the old locomotive, indicating a probable excessive combustion rate and poor fuel efficiency, this and many other factors are problems which the mechanical department must face in deciding what locomotives it will pay to rebuild.

Protecting the Employee's Pay Check

CONCERNS which buy up assignments of workers' pay checks at a considerable discount are reported to be doing thriving business among railroad men in the vicinity of New York. A discount of 10 per cent for a ten-day advance is said not to be uncommon which means an interest rate of one per cent per day. A large philanthropic organization which has interested itself in the case, along with a railroad the employees of which are involved, is unkind enough to these credit concerns to view this rate as somewhat extortionate and is inclined to see whether such operations cannot be stopped by law. The fact remains, however, that some of the employees, at least, would not seek these loans if they were not needed, and what modest-salaried man may not occasionally meet an emergency where he is badly in need of ready cash? Is not the real answer an extension of mutual thrift and loan societies among the employees, aided by the friendly co-operation of their employers? And what time, National Thrift Week, could be more appropriate for initiating greater effort toward this end?

The Decline in Passenger Business

WHILE there was a large increase in railway freight business in 1926, passenger business again declined. The decline was only about one per cent, however, indicating that finally it has almost stopped. There was, as in every year since 1921, an increase in travel in sleeping and parlor cars, the entire decline continuing to be in travel in day coaches. Total railway passenger business was almost exactly the same as it was 12 years before—in 1914. In the first six years of this period it increased until it reached its maximum in 1920. In the second six years there was lost all the gain that was made in the first half of the period. The decrease since 1920 caused the railways to get about \$340,000,000 less earnings from their passenger business in 1926 than they would have got if the traffic had been as large as in 1920. The declines in passenger business in different parts of the country have presented almost as sharp contrasts as the increases in freight business. The losses have been due to motor competition, and chiefly to the increased use of private automobiles. It might be assumed that they have been relatively the largest in the densely populated eastern territory, but this is not the case. The decline in eastern territory in the number of passengers carried one mile from 1920 to 1926 was 15 per cent; in southern territory, 21 per cent, and in western territory, 37½ per cent. Last year there was a small increase in eastern territory, a small decline in the south, and a still larger decline in the west. The explanation seems to be that in densely populated areas

the increase in the number of automobiles has been so great in proportion to the capacity of the roads and streets that many highways have become excessively congested, while in the south and west there continues to be less highway congestion and a consequent continuing increase in the use of motor vehicles for trips that otherwise would be made by train.

The Significance of Per Diem

STRANGE as it may seem, many freight train crews have little or no knowledge of per diem. Most of them have heard the term, but their ideas of its meaning are extremely vague. This has been found to be true by direct questioning of crews on various railroads in different parts of the country. This is not the fault of the men. It is the duty of the management to impart knowledge of this kind. It is a mistake to assume that because most officers have a very clear idea of how and why per diem charges are assessed, the men possess the same knowledge. It is also fallacious to believe that it doesn't matter whether freight train crews know anything about per diem. If a transfer crew knows that by delivering a cut of 50 cars to a connecting line before midnight it can save \$50 for its own railroad it is an unusual crew that will not make an effort to deliver that cut. Operating department employees should be given every opportunity to acquire more railroad knowledge. They should be encouraged to assimilate as much of this knowledge as they care to and be given facilities for doing so. If the men have a clear idea of what it is all about, there is sure to be an increase in operating efficiency.

It Can Be Done

ALTHOUGH railroads have used creosoted timbers in wooden bridges for many years, the manner of their erection deviated but little until recently from the customs developed in the building of bridges of untreated timber. Piles were chamfered to fit caps, stringers were sized and ties were dapped, with the result that the untreated or less thoroughly treated portions of the timbers were exposed to decay. Those roads which had treated timbers for the longest time had learned by experience that this practice in erection was responsible for a marked reduction in the service life which they had anticipated as the result of timber preservation, and in consequence established rules designed to eliminate unnecessary cutting of treated timber and to effect some measure of protection for the untreated wood exposed by such cutting as could not be avoided in the field. During the last five or six years certain roads had the courage to depart entirely from the established customs of bridge carpentry, and arranged to frame timbers in advance of treatment. There were those that declared that this entailed complications which would require an excessive expenditure for measurements, drawings, marking diagrams, etc. However, the practicability of this plan has been definitely proved and many railroads are now following it. The bridge department of one road has found that the simplest procedure in ordering floor timbers for steel bridges is to send the steel plans to the creosoting plant and depend entirely on the force at the plant to develop the framing diagram, details and marking system necessary for the pre-framing of the timbers to fit the bridge.

Intuition and Freight Rates

MORE or less newspaper ridicule was caused some years ago by a remark of a railroad traffic officer on the witness stand that "intuition" played some part in the making of freight rates. Apparently something of the same kind enters into the process of the re-making of freight rates by commissions. The Interstate Commerce Commission has just ground out of its busy mill a decision to the effect that "wheels, with propeller blades, used to direct attention by their revolutions to advertising matter on signboards" are entitled under the analogy rule to the third-class rating provided for wind-mill parts. The carriers had contended that they should be rated first-class, as sheet-steel or sheet-iron ware, or as wooden wheels, but the commission finds that they are not sheet-iron and sheet-steel ware nor wooden wheels, within the meaning of the classification descriptions. Neither, it said "can they be said to be windmill parts within the literal and strict application of the classification, inasmuch as they do not generate power in accordance with the usual function of a windmill," but in the absence of a specific rating it was decided that they are more analogous to the latter.

Taste in Passenger Car Decoration

SELDOM, if ever, are any two persons so similarly constituted that some of the things that give pleasure to one are not at least mildly displeasing to the other. As highly personal and individual as is this matter of taste, however, there are certain well defined principles of good taste, the observance of which leads to a minimum of displeasure and a maximum of pleasure for all individuals, irrespective of their own personal preferences within the bounds of these principles or, indeed, of their knowledge that such principles exist. These principles are the basis of the fine arts. If, then, the most effective use of the possibilities of producing favorable effects on its patrons with the interior decorations of its passenger cars is to be made by a railroad, is it not a mistake to leave the interior decoration of this equipment in the hands of the designer and engineer? While thoroughly competent in the more definitely utilitarian arts of structural and mechanical design, he is not by training expert in the selection and combination of line, proportion and color for producing the more intangible but not the less important results which flow from the good or bad effects of these selections on the minds of travelers. Is this not a task calling for the exercise of the expert knowledge of the professional interior decorator?

Terminal Operation a Changing Science

ONE of the most valuable attributes a terminal superintendent can have is adaptability. Doing things today in the same manner in which they were done yesterday will not suffice. Each new day brings its problems in the way of changed density of traffic, different weather conditions, a variation in the number of cars to be iced, and a dozen and one other things. All of these require new methods if the cars are to be handled through the terminal with maximum efficiency. An empty yard is no longer a sign of slack business; rather, it is an indication of terminal efficiency. Revenue cars

under load should not be permitted to stand anywhere for long periods, and least of all in a yard. Modern terminal operations have kept pace with the general improvement of operating efficiency. New facilities and improvements have had a great deal to do with this. A factor that should not be overlooked, however, is the matter of time leaks. A switching crew's tour of duty consists of only 480 minutes. From this must be deducted 20 minutes for lunch, 10 to 15 minutes for getting the crew in to avoid overtime and an occasional delay in getting the switch engine from the engine-house. Switch engines cost from \$10 an hour up to operate. This is 16-2/3 cents a minute. Six minutes saved means a dollar saved. Unless the supervisory force is very careful the wasted minutes amount to an alarming figure. In a large terminal the elimination of time leaks means a large saving; even in a small terminal the saving is very much worth while.

What Employees Should Receive Training?

A RATHER capable mechanic who recently left the service of a large and well-organized public utility corporation was heard to remark that with this company everything was so systematized that he had no chance to use his brains at all. Every motion he could possibly make, every job which he could be called upon to do was described in every detail in the company's manual, which he had to learn by heart and follow to the letter.

It is doubtful if the same criticism could be made of most railroads. Rather, some would say, if they err at all, it is in the direction of not giving their employees sufficient instruction rather than in overdosing them with it. As a matter of fact, is it not likely that a major movement in the direction of employee education could be undertaken with the promise of bringing rich rewards in more efficient service? Such educational efforts as are being exerted are, generally speaking, productive of much good—apprentice training, the proceedings of the associations, railway club discussions, foremen's clubs, etc.

But if systematic study and discussion is good for certain departments, certain localities and certain ranks of employees, why not for all? Could not the yard clerk or the beginner in train service profit as well by some formal courses of instruction as the apprentice in the shop?

The British railways have gone a long way in stimulating study both by employees' clubs and in night school classes. Co-ordinate with the educational activities on the several railways the professional society, the Institute of Transport, stands ready to honor with its various grades of membership those who show proficiency in the formal courses which it outlines.

Study can never take the place of experience. It serves rather as a complement to such experience—but an extremely valuable complement it is, systematizing experience and making available to everyone the lessons which experience teaches. Formal study for the younger railroad men is of particular importance aside from the mere facts which they will learn thereby; it imparts the habit of study and inquiry. Persons who have to make decisions where economic questions are raised need this studious point of view—else they may arrive at erroneous and costly decisions through emotional bias. Habits of study inculcated in young railroad men today will

mean good material from which future officers can be selected. And upon the character of its officers the whole railway industry depends.

Half-Way Measures Will Not Suffice

ALTHOUGH advancement in the administration of track maintenance during the last two decades has not been marked by anything that savors of the spectacular, commendable progress has been made. Improved practices and more careful planning and allotment of appropriations for maintenance have had a definite part in the growing efficiency of railway transportation. Much of this advance can be ascribed to better administration, for, regardless of the particular form of organization, most roads have provided in some way for system supervision of maintenance of way work by a department or staff officer who has been trained in maintenance of way and who devotes his entire attention to this one phase of railway operation.

There are good reasons for the adoption of this plan. Operating vice-presidents and general managers have come to realize that maintenance of way has developed a technique of its own which one cannot master in its entirety without years of experience in actual field work. They have learned that sound decisions in the appropriations for labor, allotments of material and distribution of work equipment to the several districts, divisions and sub-divisions demand a more thorough knowledge of conditions and requirements on all parts of the system than can be acquired by a system officer unless he devotes his entire time to this one branch of the service. Further than this, it has been found necessary to assign the duty of keeping informed on current developments in this field, to someone who is qualified to judge of their merits and is capable of taking the best practicable advantage of them.

There is, however, a wide disparity in the results obtained in pursuance of this general policy, not only as between roads but also as between different parts of maintenance of way on individual roads. Some roads have effected outstanding improvements in the administration of the entire department. Others excel in certain operations. There are also wide variations in the proportionate expenditures of different roads for the supervision of maintenance of way, for while most managements now appreciate the necessity for system supervision, not all have realized that this supervision cannot be made effective with a limited staff. One road, for example, in conforming with the prevailing movement for a greater discrimination in the distribution of rails, issued orders to track forces engaged in rail renewals, to the effect that all "A" rails should be segregated from the others released from track, following which it was discovered by mere chance that a foreman who had experienced difficulty in identifying the "A" rails was marking every seventh rail yellow because he had made the discovery that "about one rail in seven was an 'A' rail."

It would be difficult to cite a more pertinent example of the futility of attempting to apply more scientific methods to track maintenance without providing sufficient supervision to insure the necessary "follow up." Refinements in practice in almost any line of endeavor cost money and little is to be gained from an effort to apply them by half-way measures.

The Railroads, the Block System and the Government

THE report of the Bureau of Safety on the Rockmart (Ga.) collision, December 23, was issued on January 15, and an abstract will be found in another column. As often happens in such cases, the investigation developed a number of interesting questions of practice and discipline, leading in diverse directions. The main question, however, is the space interval system versus "Time-table and train orders," to use the government's phrase.

This collision is notable as being the third, within a little over one year, between northbound and southbound Florida express trains, on single-track railroads, all due to the same general cause. The other two were at Chickamauga, Tenn., September 24, 1925 (the Dixie Flyers), and at Gamble, Ala., April 25, 1926 (the Seminole Limiteds). The casualties in the three collisions total nearly 300; 32 killed and 267 injured.

Considering either the lessons of 40 years' experience in America and England, or the views of the ablest railroad officers; or looking either at the standards of the government or the expectations of the most intelligent public sentiment, the fundamental cause in all three of these cases must be stated as the operation of the trains without the benefit of the block system.

At Rockmart the block station was some 4,000 ft. north of the switch at which the northbound train should have entered the side track, and the southbound train was allowed to leave with a block card which gave it clear track after the arrival (at the side track) of the northbound train. The report, in its introduction, says that the line is operated by "time-table, train orders and a manual block system"; but such an arrangement is a virtual suspension of the block system. The report tacitly recognizes this by making no mention of any block signal, block station, block section or any space interval feature in connection with the movement of the northbound train. The northbound engineer was working under precisely the same conditions as would have existed if no block system had ever been heard of.

Not only in situations like those in which these three collisions occurred, but on thousands of miles of road all over the country there is crying need for a better understanding as to what we mean by the term "block system." Where a manual block station has only one signal post; and has switches at some distance away, with no distant or cautionary signal, the system cannot properly be termed a block system unless all trains are required to run at meeting points with speed under full control within strictly-defined yard limits.

One essential difference between running under the block system and running by train orders is the difference between requiring an engineman to read and remember, for some little time, a written paper (which he may put in his pocket) and requiring him simply to see a large light, or a semaphore arm, fixed at the side of the road at or near the point where he must stop, which, if he is awake, literally forces itself on his attention, at the right place and the right time. The fact that enginemen do occasionally disregard such fixed signals cannot obscure the other fact that the fixed semaphore is safer than the paper.

Another fundamental point which is illustrated in all three of these recent cases is, as expressed by one critic, that running fast trains on slow railroads must always involve peculiar risks, very difficult to deal with. The term "slow road" is used to denote a road lacking the facilities for moving trains at high speed for

long distances except at the cost of numerous complications in the operating rules. Passenger business to and from Florida has increased so rapidly within recent years that improvements in facilities have been called for faster than the roads could provide them. The only recourse in such a case, if the highest safety is to be provided, is to refuse to add fast trains until the added facilities are ready. On a single track road having inadequate signals and long sidetracks, with the road occupied all the time by other important trains besides the fast expresses, the convenient and efficient operation of space-interval rules imposes severe limitations on speeds. But there is no escape from these limitations except by trusting to safeguards which long experience has proved to be inadequate.

The question raised by collisions like Chickamauga, Gamble and Rockmart may be said to be, How can the superintendent best meet the problems of safe operation with incomplete signaling? What change should be made in present practice on lines not equipped with automatic signals and perhaps not destined to have them for many years? The obvious answer is, introduce the manual block system, with rules as safe as they can be made, taking the plant just as it is. In the development of automatic train control the government has taken a hand in the most minute details, even going to the extent of exhorting individual railroads, by name, to experiment in almost unknown fields. The railroad manager who believes that such governmental activity would be undesirable in general operating questions will do well to make sure that his own activity is fully adequate to the needs of the present situation.

Valuation, Wages and Rates

THE question of the way in which a lawful valuation of the railways must be made is one that can be settled only by the Supreme Court of the United States. In settling it the court will indirectly determine what the valuations of individual railways and the aggregate valuation of all must be. While the principal issues in controversy are issues of law this does not and will not prevent discussions outside the courts of the economic questions presented.

Senator Wheeler of Montana, the nominee for vice-president on the so-called "Progressive" ticket in 1924, has given an interview which is being widely distributed through labor union publications among railway employees. "This scheme to value the railroads at somebody's guess as to what it would cost to reproduce them," he declares, "is the biggest swindle in the country. It has a direct and most important bearing on railroad wages." He says there are two payrolls on a railroad, that of money—interest and dividends—and that of men—wages and salaries; and "the railroads are trying to pad the money payroll" by getting a big valuation. He concludes the success of this attempt would reduce the amount that could be paid in wages and make impossible reductions of rates. We shall doubtless see a great increase in such propaganda distributed among railway employees and the public.

Disappointments of Valuation Advocates

The history of railroad valuation has been filled with disappointments for its advocates. When the valuation bill written by Senator LaFollette was passed in 1913, the advocates of valuation favored basing it largely or mainly on cost of reproduction, the ascertainment of which was specifically required by the LaFollette law.

They confidently predicted the outcome would show the property investment account and total capitalization of the railways were greatly in excess of a fair valuation, which would justify large reductions of rates, advances of wages, or both. With hardly an exception railway executives opposed a valuation. They held that the fair and reasonable way to make rates was to adjust them according to what the traffic would bear and make them high enough as a whole to let the railways earn a return sufficient to enable them to raise the capital needed to provide good and adequate transportation.

There has now been spent on the valuation about \$120,000,000—\$30,000,000 by the commission and \$90,000,000 by the railways. The avowed purpose of its advocates was to get for the public its "constitutional rights" by providing a basis for preventing the railways from earning more net return than they were entitled to. The railroads were, in effect, made the defendants in the most gigantic proceeding to determine property rights in history. They could do only one thing—protect to the best of their ability what they believed to be their constitutional rights. The struggle is being conducted according to rules enunciated by the courts before it was commenced. Those who started it now apprehend that, if carried out under the rules under which it was begun, it will not result as they anticipated. Therefore, they cry "swindle," say the railways are trying to get "phantom dollars" recognized, and ask that the rules be so changed the railways cannot possibly win.

Radicals Cannot Be Satisfied

What they say shows they would not be satisfied, however, even if they won under the new rules they demand. Senator Wheeler says the valuation should be based on "prudent investment." Interstate Commissioner Lewis, who is in general charge of the valuation, when asked before a House committee a few days ago as to the total value of the railroads, said: "We have a very definite idea now of what the carriers have and it centers around \$22,000,000,000." It seems plain from all the developments that have occurred that Commissioner Lewis' own estimate indicates the commission's views of the approximate actual cost of the railroads to date. Senator Wheeler, in his interview, estimated their actual cost at \$15,000,000,000. Such wild statements, and their publication in certain papers, are obviously intended to so prejudice railway employees and the public that they will regard as excessive and a "swindle" a valuation of any amount that is at all likely to be made by the commission or approved by the courts. Wheeler is an advocate of government ownership. Such malicious misrepresentation is always to be expected from men of socialistic tendencies. They originally favored the making of a valuation as one means of promoting the destruction of private ownership. They are determined to use it for that purpose, whether it is small or large.

Labor's Dollar and Capital's Dollar

A significant fact is the different ways in which some labor leaders, and public men such as Senator Wheeler, talk at different times about the American dollar. Measured in commodity prices its purchasing power—that is, its value—is about one-third less than when the valuation of railroads was begun. Those who have sought advances in wages have reasonably and properly claimed that in fixing wages allowance should be made for this decline in the purchasing power of money. This has been done; in fact, wages on the railways and in other industries have been advanced much more in proportion than the increase in the cost of living, as

measured in money. The result of the increases in prices and wages has been to cause a great decrease in the value of each dollar of net return earned by the railways. All that a valuation based upon the present cost of reproducing railway properties, rather than upon the amount of money they have cost, would do, would be to recognize in behalf of the owners of railway property the decline that has occurred in the value of money. In other words, it would do for the railways the equivalent of what would have been done for their employees if money wages had been advanced only in proportion to the decline in the value of the dollar in which their wages are paid. From the standpoint of many labor leaders and radical public men it is right to raise wages much more than enough to offset a decline in the value of the money in which they are paid, but all wrong to increase the valuation of the railways and the number of dollars in which the net return upon it is paid only in proportion to the decline in the value of the dollar. The former is "human justice." The latter is a "swindle," although the purpose in both cases is largely the same—to compensate for the decline in the value of money.

Probable Effect of Valuation

While it seems probable that under decisions of the Supreme Court the valuation finally placed on the railways will greatly exceed Senator Wheeler's absurdly low estimate of the "prudent investment" that has been made, or even the figure mentioned by Commissioner Lewis, it is much too early for those who receive railway wages or pay railway rates to become pessimistic, or owners of railway securities to become highly optimistic, about the probable valuation and its results. Some of the estimates that have been made of what a valuation based on cost of reproduction would be are as unreasonably high in proportion as Senator Wheeler's "prudent investment" figure is unreasonably low. Furthermore, railway officers know that neither railway wages nor railway rates ever will be fixed with any close relationship to railway valuation. Theoretically, the Interstate Commerce Commission has been basing rates on its "tentative valuation" for six years. In only one of these years have the railways as a whole earned approximately what the commission has held is a fair return on its own valuation, and the western lines have never come anywhere near earning it, but meantime, rates have been largely reduced and since 1922 wages have been increasing. Railway officers know only too well the conditions and influences that determine the wages they must pay and the rates they can get to entertain the illusion that all they have to do to get a big increase in net return is to get a big valuation.

The Return Hoped For

In the future, as in the past, railway wages will be determined mainly by wages in industry in general. In the future, as in the past, rates will be determined mainly by public sentiment, influencing them through regulation; by what the traffic will bear, and by competition between the railways themselves and between them and other means of transportation. All that most railway executives hope for is that the railways will be allowed to earn enough net return to raise capital adequate for effecting needed improvement and expansion of railway properties. They are fighting for a lawful valuation because it should help them to get this much net return. Anybody who hopes or fears that a valuation will enable them to get more is an optimist or a pessimist who disregards past experience and the influences to which railway regulation and management in this country are subject.

Winter Work Stabilizes Labor on the Delaware & Hudson

*Experience on this road demonstrates the advantages of a
twelve-month maintenance program*

*On the Champlain Division of the
D. & H.*

ONE of the outstanding policies of the maintenance of way department of the Delaware & Hudson is that of programming maintenance work over the 12 months of the year as a step toward the establishment of uniform trained forces and the full utilization of those forces throughout the winter when not actually engaged in fighting snow storms. Until recent years maintenance of way work on the Delaware & Hudson was done on a strictly seasonal basis; the entire program was crowded into the spring, summer and fall months; forces were built up during the working seasons and reduced during the winter, except in emergencies; and the inevitable result was over-crowded programs during the summer, maximum interference with traffic during the work, heavy labor turnover with the continual influx of inexperienced labor, and, of no less importance, the accomplishment of inferior work by this class of labor and the general lowering of the morale of the regular forces which could not expect steady employment or the most satisfactory working conditions under these circumstances.

Adding to the disadvantages of this practice as carried out on the D. & H., was the fact that in spite of the lack of winter work it was always necessary to keep a large number of men on the payroll to meet snow emergencies, serious difficulty having been experienced in many in-

stances in obtaining additional forces when and where needed on short notice. Without a definite program of winter work, these forces accomplished little other than the handling of snow during severe weather, remaining practically idle the remainder of the time as far as constructive work was concerned.

The solution of the D. & H.'s problem lay, apparently, in a redistribution of its maintenance program to provide for winter work, and uniform forces throughout the year. Recognizing this, and in spite of the favorable and unfavorable experiences of other roads and the severe winter conditions existing throughout its territory, the D. & H. began experimenting with certain classes of maintenance work during the winter. These experiments showed conclusively that in spite of the cold weather and severe storms often encountered on their lines, open periods occurred frequently enough and long enough in duration to permit the effective accomplishment of considerable constructive work. As a result of these experiments a larger amount of work has been planned and carried out during the past few years, until the former practice of strictly seasonal employment, with its disadvantages, has given way to a conservative yet highly effective policy of maintaining as uniform forces as possible through the handling of various classes of work during the otherwise slack winter months.

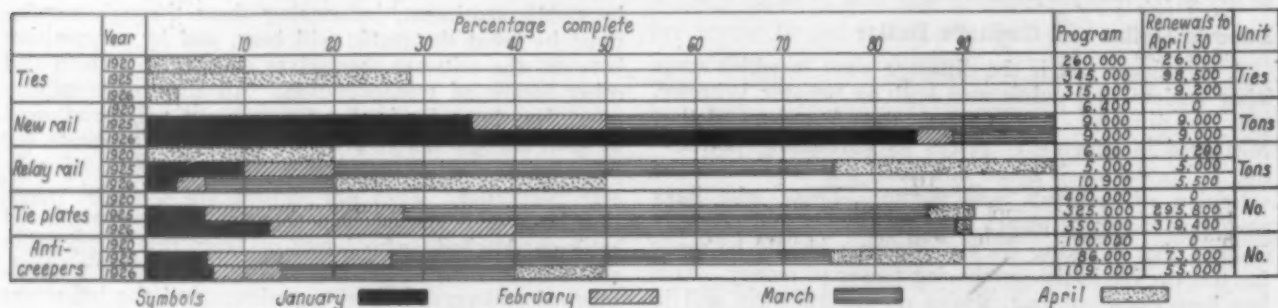


Chart No. 1—Major Items of Track Work done on the D. & H. During the Winters of 1920, 1925 and 1926

As on many other roads which undertake maintenance work during the winter, the main operations include the laying of new and relay rail, the installing of tie plates and anti-creepers, the renewing of switches and frogs, and the regaging of track, no attempt being made to carry on any kind of work which involves disturbing the ballast or roadbed. Other work that it has been found practical to perform to a greater or less extent includes the repair of fences, other than digging in posts when the ground is frozen, the widening of embankments with cinders in connection with realignment work, the improving of drainage conditions, the burning and cleaning of the right-of-way in March and April, and such other work of minor importance as can be accomplished readily in the winter, and which, if not done at this season, must be carried over and included in the crowded maintenance program of the summer months. While all of these classes of work have been undertaken successfully throughout the past few winters, the amount of each class completed has been governed to a large extent by the character of the weather and the amount of time that the forces had to be employed in fighting snow to keep the tracks open. As programed on the D. & H., how-

program of laying 5,000 tons of relay rail, and the installing of 295,800 tie plates and 73,000 anti-creepers, while that completed in the same months of 1926 consisted of the laying of 5,500 tons of relay rail and the installing of 319,400 tie plates and 55,000 anti-creepers, these amounts in each case representing a considerable percentage of the entire program for each year. The fluctuations noted with respect to the total amount of each class of work completed and the amount accomplished in each month are to a large extent due to the character of the weather which was encountered.

Similar to the chart already noted, is chart No. 2, which shows the amount of the more important track work accomplished on the Champlain division of the D. & H. during the winter months of the same years represented in chart No. 1. The results shown in this chart are of particular interest owing to the fact that this division is the coldest on the railroad, the temperature often dropping to as low as 30 to 40 deg. below zero, and the one which generally experiences the most severe snow storms. In spite of this it will be seen that, closely following the trend of the system work as a whole, all of its new rail was laid during the winters of 1925 and

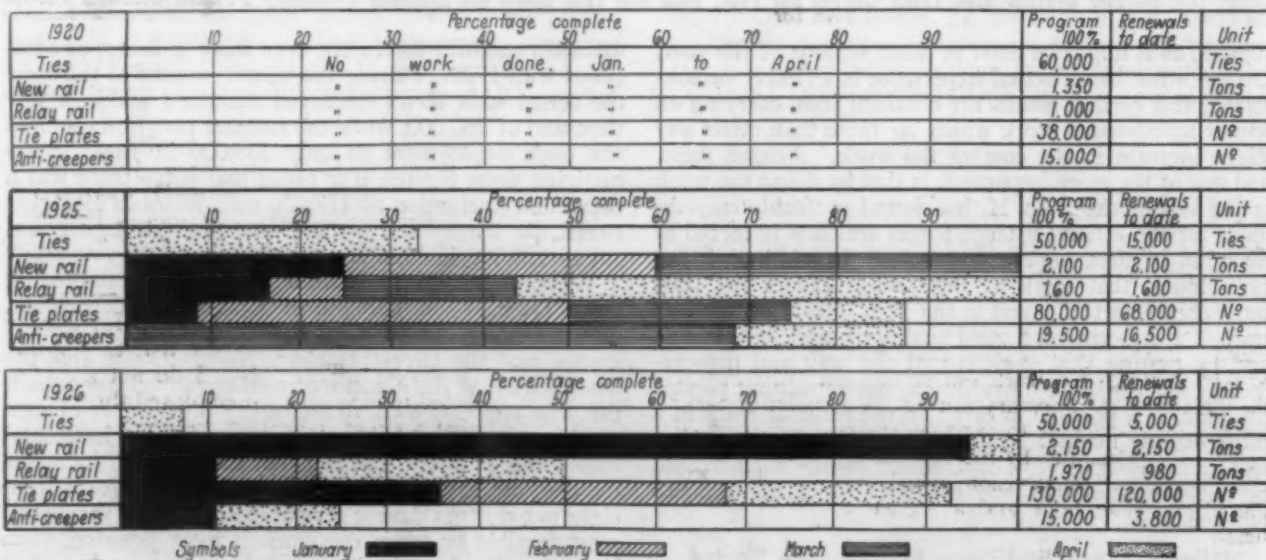


Chart No. 2—In Spite of This Being the Coldest Territory on the D. & H. the Champlain Division Completed Much Winter Work

ever, one kind of work or another is at hand at all times to keep the forces effectively employed, and all the men clearly understand that results are expected.

That actual results have been accomplished during the past two winters is clearly evidenced in chart No. 1, which shows the character and amount of the more important work completed during the first four months of 1920, 1925 and 1926. As indicated in this chart, practically no major work was accomplished by the large forces employed during the winter of 1920, except the installation of about 26,000 ties and the laying of 1,200 tons of relay rail in April, the forces being carried throughout the other winter months mainly to cope with winter storms which were particularly severe in March of that year. In 1925 and 1926, on the other hand, with fewer man hours employed, as indicated in chart No. 3, but with more favorable weather conditions, the entire new rail programs were completed by the end of March of each year, in addition to considerable other important work. This other work accomplished in the first four months of 1925 consisted mainly of completing the year's

1926 and that in addition, a large percentage of its other regular track work was carried out successfully.

Programing and Advance Preparations

Necessary to Winter Work

In accomplishing these results on the D. & H., the first problem encountered was to overcome the precedent of former years and to make it clear to everyone concerned that the new policy contemplated the accomplishment of constructive work for every man hour employed. Accordingly, programs were mapped out for each division and plans were made to meet them. The largest item of maintenance work undertaken during the winter, as has been noted, is the laying of new and relay rail on the main and branch line tracks, which, in spite of winter conditions, is carried out in much the same manner as in summer. In general this work is pushed through in January as far as possible, for two reasons: (1) because the present distribution of maintenance of way accounts will not permit rail laying in advance of January 1, and (2) because January is a comparatively open month in

the territory of the D. & H., as compared with February, when the most severe storms generally occur.

In most cases on double track, the work is facilitated by obtaining the unrestricted use of the track to be relaid, a condition which is made possible on the D. & H. in the winter with little interference to traffic owing to the lighter freight movement and the greatly reduced number of passenger trains.

Increased Cost Is Offset by Advantages

In accomplishing this work it is not the contention of the D. & H. that the actual work can be done more economically in winter, nor as economical, in some in-

stances, as it might be done at other seasons of the year. On the other hand, actual experience has clearly demonstrated that certain results are obtained from carrying on winter maintenance work which far more than offset any slight increase in the cost of the work. Among these, and one of the more important, is that by doing the work in the winter the D. & H. has found profitable employment for the relatively large forces which it is forced to maintain to meet snow emergencies. In addition, it has been found that work at this season causes the least interference to traffic and is the least interfered with by traffic. Furthermore, a good quality of work is obtained, and by getting this work out of the way and thus reducing the work necessary during the remaining part of the year, it is possible to carry on the summer work in a more orderly manner by the regular experienced forces, and with closer supervision, which results in increased output per man hour and a higher standard of maintenance.

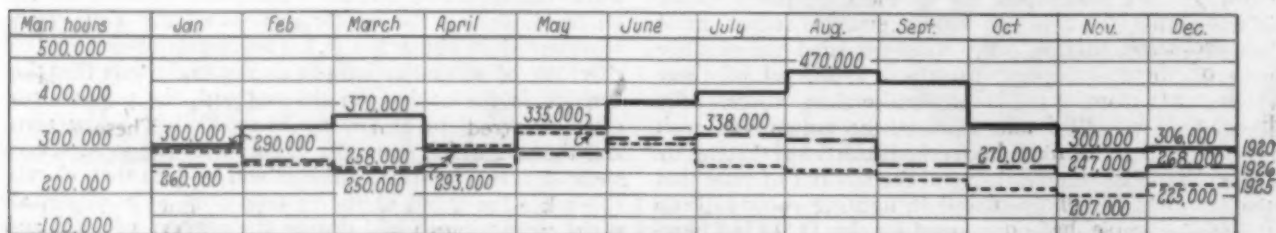


Chart No. 3—The System Man-Hour Curves for 1920, 1925 and 1926 Show the Decided Tendency Toward Uniform Forces

stances, as it might be done at other seasons of the year. On the other hand, actual experience has clearly demonstrated that certain results are obtained from carrying on winter maintenance work which far more than offset any slight increase in the cost of the work. Among these, and one of the more important, is that by doing the work in the winter the D. & H. has found profitable employment for the relatively large forces which it is forced to maintain to meet snow emergencies. In addition, it has been found that work at this season causes the least interference to traffic and is the least interfered with by traffic. Furthermore, a good quality of work is obtained, and by getting this work out of the way and thus reducing the work necessary during the remaining part of the year, it is possible to carry on the summer work in a more orderly manner by the regular experienced forces, and with closer supervision, which results in increased output per man hour and a higher standard of maintenance.

Winter Work Stabilizes Maintenance Forces

While all of the above results have been effected by the winter work policy of the D. & H., the principal

maintain uniform forces are even more striking, as compared with 1920. During the winter months of this year the actual man hours employed remained within a few thousand of 260,000, while the summer program required the peak employment of only 338,000 in July. Summarizing these figures, it is noted that while there was a maximum fluctuation of 177,000 man hours in 1920, between the winter and summer months, this figure was cut to 128,000 in 1925 and to 88,000 in 1926.

While these figures indicate a decided straightening out of the man hour curve in the maintenance department of the D. & H., it is important to note that the figures quoted and the curves in chart No. 3 do not give the true relation of the number of men employed throughout the year and that a curve indicating the number of men employed would assume an even more uniform horizontal line. This is due to the fact that the D. & H. increases the working day of a part of the maintenance force from eight to ten hours during several months of the year when most feasible or when the work is most pressing, such increases showing up in a man hour curve when they would not alter a force curve. Thus, for example, the high spots in man hours in April, May and June, 1925,

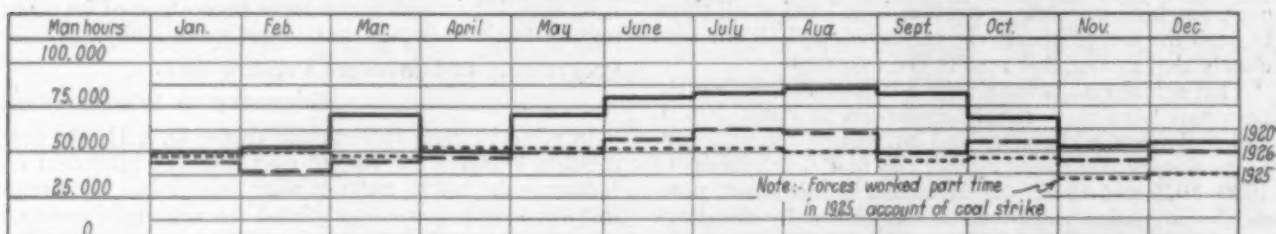


Chart No. 4—Winter Work Has Greatly Stabilized the Man Hours Employed on the Champlain Division

result sought and accomplished has been the marked stabilizing of the maintenance of way forces, with its attendant advantages. That this has come about as a result of carrying on winter work is clearly indicated in chart No. 3, where the man hours employed during 1920, before winter work was the policy, are compared with the man hours that were employed during 1925 and 1926. By referring to this chart it will be noted that in 1920 the man hours employed fluctuated widely, ranging from

were due to working a part of the track forces for a ten-hour day in order to take advantage of an early spring for making tie renewals, and were not due to any appreciable increase in force. The dropping of the curve during July and August, 1925, is the result of working practically the same forces for an eight-hour day, and the further drop of the curve through the remainder of the year was due to the fact that it was necessary to work on a part time basis during the coal strike which was in

effect at that time. In 1926, owing to a late spring, it was not possible to get much of a start on tie renewals, so that the increase in man hours due to working the regular forces on a ten-hour basis did not occur until the latter part of June, July and a part of August. Other conditions which enter into the fluctuation of man hours are, of course, the employment of the regular forces on capital expenditure projects and on work for outside parties. In practically all of these instances it is apparent, therefore, that while there still exists a considerable difference in the number of man hours employed during the winter and summer on the D. & H., this is not due to a large increase in the maintenance forces, but rather, in large measure, to carrying on other than strictly maintenance work, and the policy of working the regular forces an increased number of hours during certain seasons.

These same reasons apply to chart No. 4, which, in spite of them, shows the unusual uniformity in the number of man hours employed on the Champlain division during 1925 and 1926, as compared with the widely fluctuating man hours employed on this same division in 1920.

This stabilizing of the maintenance forces on the D. & H. has, of course, been due largely to its policy of completing certain track work during the winter, and while specific attention has been drawn to the work accomplished by the track forces, it is important to note that the winter work policy of the D. & H. extends to all maintenance forces, and that in some respects it is carried

for the past few years, labor troubles have disappeared; labor turnover is a thing of the past; and of large importance, more and better work is being accomplished in fewer man hours and with a marked decrease in the number of personal injuries.

With the management of the Delaware & Hudson, credit for the maintenance policies on that road, together with the results being obtained, is due to H. S. Clarke, engineer maintenance of way, to whom we are indebted for the information contained in this article.

Electric Locomotives for the Long Island

SEVEN electric locomotives for the Long Island Railroad were ordered in March, 1926, and were delivered on November 30, 1926. These are to be used in shifting service on the Bay Ridge division. Electrification of this division, involving about 100 miles of track, is now nearing completion. Each locomotive, consisting of two units, is rated at 2,000 hp., weighs 150 tons and can be operated at a speed of 25 m.p.h. At a speed of 12.4 m.p.h. the drawbar pull is 88,400 lb. The locomotives may be operated as two-cab locomotives or each of the units may be operated separately. The mechanical parts were built at the Altoona shops



Seven, Two-Unit, Electric Locomotives to Be Used on the Bay Ridge Freight Division of the Long Island

out more successfully in the bridge, building and water service departments than it has been possible to carry it out in the track department.

The Delaware & Hudson is definitely convinced of the advantages of holding its experienced forces, and while winter work accomplishes this to a large extent, it is only one of the expedients employed to make maintenance work attractive to the better class of men who seek steady employment and favorable working conditions. Other inducements offered the maintenance forces of the D. & H. include a systematic program of training and promotion, with an equal opportunity for each man; a differential in the pay of the track forces, ranging throughout a period of from six months to five years; death and disability insurance according to their salaries, regular two-week vacations for foremen, and track awards for proficiency in carrying out their work.

Having followed out these practices on the D. & H.

of the Pennsylvania Railroad. All electrical equipment was supplied for these locomotives by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

These locomotives represent one more step in the development of the electric service of the Long Island Railroad. They are designed for the purpose of establishing a standard switching locomotive, not only for the Long Island, but also for the Pennsylvania System. Since 1905, when the first Long Island electric lines were placed in operation, the electrified track miles of the Long Island have increased from 64 to 300, the current consumption from 20,000,000 to nearly 200,000,000 kw. hours a year and the number of multiple-unit cars from 187 to 904. The electrified passenger equipment operates from a 600-volt d.c., third rail; and 11,000-volt overhead a.c. contact lines will be used on the Bay Ridge freight line.

Changes in Rates from Florida Proposed

WASHINGTON, D. C.

THE Interstate Commerce Commission on January 17 made public a proposed report by Attorney-Examiner Hillyer on the complaint filed by the railroad commissioners of Florida against the rates on citrus fruits, pineapples and vegetables from Florida to the principal markets throughout the United States and Canada. The examiner recommends findings by the commission that the rates on citrus fruits and pineapples are not unreasonable *per se* under existing minimum and estimated weight but that an increased carload minimum and reduced rates based thereon and upon other changed conditions should be prescribed for the future. To promote uniformity and simplicity the attorney-examiner also recommends that the rates be stated in cents per hundred pounds. Rates on fresh vegetables, potatoes and cabbage, in carloads, the examiner finds in the main not unreasonable, with certain exceptions, but he recommends that the carriers be required to recast their vegetable tariffs in simple and concise form under alternate methods so as to produce no higher revenues per car than under the prescribed rates on citrus fruits and also that they be required to establish simplified rates on potatoes and cabbage in relation to the rates prescribed on citrus and vegetables, respectively.

"The general evidence with respect to the fruit and vegetable industry in Florida at this time shows no condition of depression which would warrant a substantial reduction in rates to points throughout the country as might be contemplated under the terms and spirit of the Hoch-Smith resolution," the report says, "nor do complainants ask a general reduction upon that ground. Neither does the evidence with respect to the financial condition of the three major originating lines display overflourishing net operating incomes which would warrant a substantial general reduction upon these agricultural products upon such grounds."

As illustrating the changed conditions in Florida since the earlier cases in which the commission has adjusted rates from that section the report says in part:

Shipments of boxed citrus fruit from Florida were 4,360,497 during the season of 1910-1911 when the early cases were decided, and 19,072,731 boxes during the season 1924-1925, or an increase of about 304 per cent in fourteen years. Shipments of fresh vegetables, watermelons, pineapples and strawberries from Florida aggregated 25,773 cars during the season of 1913-1914 and 36,567 cars during the season 1924-1925, an increase of over 40 per cent in 10 years.

Shipments of citrus in 1924-1925 represent an increase of about 50 per cent in four years over those during the season of 1920-1921, and from 24,750 cars in 1918-1919 to about 55,000 cars in 1923-1924, an increase of more than 100 per cent in five years.

Formerly about 52 per cent of this perishable traffic moved by rail, river and roads to Jacksonville and by water.

The unusual increase in freight tonnage upon the lines in Florida may be briefly illustrated by the following statistics: The tons of revenue freight handled in Florida by the Seaboard Air Line were approximately 2¼ million in 1910 and 5½ million in 1924; and by the Florida East Coast ½ million in 1910 and 3¼ million in 1924. In 1908 the Atlantic Coast Line, Seaboard and Florida East Coast handled 361,930 tons of fruits and vegetables on their entire lines. In 1924 the Atlantic Coast Line handled from Florida alone 524,034 tons of citrus and 251,765 tons of fruits and vegetables. In 1908 the Florida East Coast handled 77,677 tons of fruits and vegetables and in 1924 89,226 tons of citrus fruit and 169,232 tons of vegetables and melons, a total of 258,458 tons.

The traffic density in the south increased during the period 1920 to 1924 while there was a decrease in the United States as a whole and the density in Florida has increased in greater ratio than in the other sections of southern territory. The

increase of the Florida East Coast, 1924 over 1910, was 485 per cent. In 1925 the density increased to such unprecedented proportions that a serious statewide congestion occurred, necessitating embargoes. For that reason statistics for the season 1925-1926 are not dwelt upon in this report.

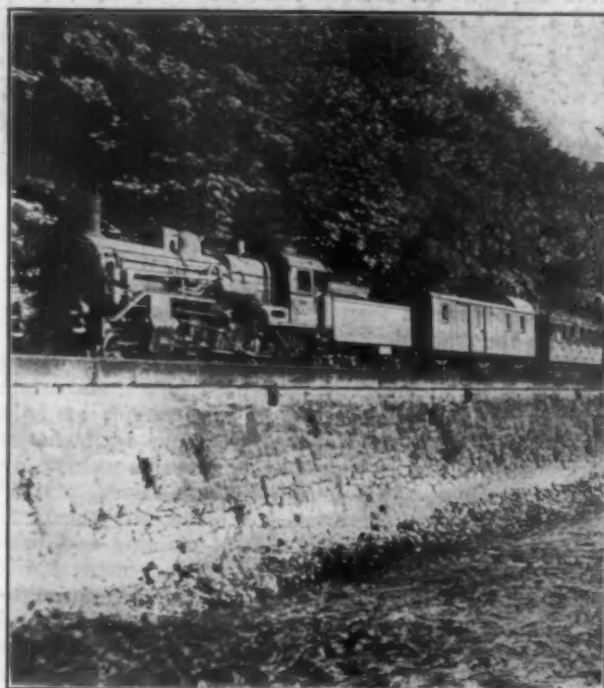
These great increases in tonnage have produced large increases in operating revenues. The Florida East Coast's operating revenues of 1924 represent an increase of 354 per cent over those of 1912, while the operating expenses increased only 326 per cent, the operation ratio decreased 6 per cent notwithstanding unusually heavy charges to expenses for depreciation of bridges, etc. During the same period its tons of revenue freight per train mile increased 169 per cent, and net railway operating income 353 per cent. Its net railway income per mile of road increased from \$1,608 to \$5,782, or 260 per cent. Traffic density has increased faster on this line than on any other railroad in the south.

During the same period the Atlantic Coast Line's operating revenues increased 144 per cent, expenses 168 per cent, operating ratio from 67.36 to 73.77 per cent. Its tons of freight revenue per train mile increased 92 per cent, and net railway operating income 58 per cent. Its net railway income per mile of road increased from \$2,130 to \$3,121.

During the same period the Seaboard's operating revenues increased 133 per cent, expenses 154 per cent, ratio 9 per cent. Its tons of freight revenue per train mile increased 93 per cent and net railway operating income 64 per cent. Its railway income per mile of road increased from \$1,793 to \$2,524.

In 1923 the Florida East Coast earned 5.3 per cent, in 1924, 7.3 per cent and during the past five years an average of 4.91 per cent based upon the final value fixed by the commission in *Florida East Coast Ry. Co.*, 84 I. C. C. 25. The Atlantic Coast Line earned 6.2 per cent in 1923 and 6.1 per cent in 1924 upon its investment in road and equipment. Defendants point out that during the past five years they earned less than 6 per cent upon their property investment and that over a period of 15 years the shortage, less than 6 per cent, averaged about \$20,000,000 per year. For the year 1925 the Southern carriers transferred to profit and loss, after paying all dividends, about \$101,000,000, bringing their corporate surplus up to about \$533,000,000.

The three large lines of Florida are in the throes of great expansion of their facilities which will require stable credit. This condition necessitates caution upon the commission's part in making any revision of their rates on such a relative important class of traffic as perishables. The enlargement of the fruit and vegetable industry in Florida should not be fostered by any drastic reductions in rates which would stifle the proposed expansion and betterment of railroad facilities.



A Chemnitz-Dresden Train in Germany

Lubrication Costs Watched Closely on A. C. L.

Supply forces work with motive power department in avoiding waste—Cylinder oil cut in half

EARLY in 1925 the Atlantic Coast Line applied mechanical lubricators to 89 of its locomotives. Prior to this, hydrostatic lubricators were used entirely for feeding valve oil to the cylinders, and the number of miles a locomotive would operate on a pint of valve oil ranged from 45 to 50. Thinking that mechanical lubricators would ultimately prove more economical, some 20 Santa Fe type locomotives and 69 other locomotives of the heavier types were so equipped. But when first put into use an average of only about 30 miles was obtained from these locomotives for each pint of valve oil used. Under the system by which this road accounts for the uses of oil in the lubrication of equipment, however, the general superintendent of motive power as well as the superintendents of motive power and each master mechanic on the divisions on which these lubricators were used began to receive each month a record of each mechanical lubricator equipped locomotive. It was soon seen that the adjustments of the lubricators were improper and in less than a year the average mileage of these locomotives was raised to 60.2 miles per pint of valve oil, or an increase of from 15 to 20 miles over that with hydrostatic lubrication, while the cost of this cylinder lubrication was reduced

The immediate cause of this reduction in the consumption of cylinder lubricant is the special record of all the oil used in these lubricators, of which mention has

ATLANTIC COAST LINE RAILROAD COMPANY
REPORT OF SUPPLY STATION AT _____ FOR THE MONTH OF _____
1925 OF OILS ISSUED FOR THE
PURPOSE OF LUBRICATING CARS AND ENGINES

	Cylinder Oil Gallons	Superheated Oil Gallons	Oil Oil Gallons	Red Cup Crude Pounds	Journal Compound Pounds
No. 1—Amount on hand
No. 2—Amount consumed during month
No. 3—Total balance during month
No. 4—Amount issued Round House—Firemen
No. 5—Amount issued Round House—Engineers
No. 6—Amount issued Car Department
No. 7—Amount issued Train Hands—Passenger
No. 8—Amount issued Train Hands—Freight
No. 9—Amount issued Work Train
No. 10—Amount issued for Shop Engines
No. 11—Amount for other purposes
No. 12—Total issued
No. 13—Amount on hand at close of month

I certify that the above is correct:

Exhibit A—Front Side of Form Used When Issuing Oil

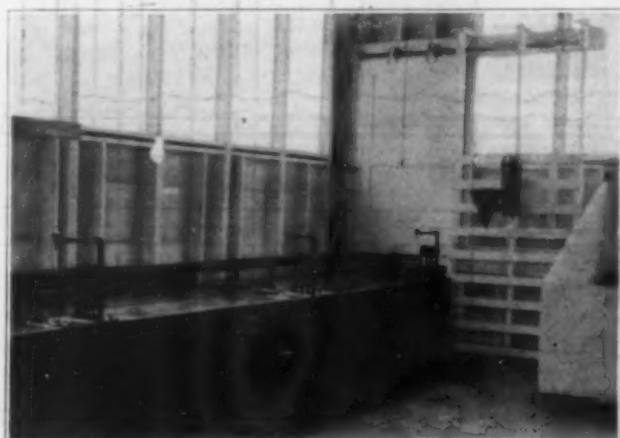
already been made. The above tabulation shows how this report is prepared. It gives for each locomotive, and summarizes for all locomotives, the mileage operated during the month, the number of pints of valve oil used, and also the quantity of superheat oil used, if any, together with the cost of the oil used, the date

PARTIAL STATEMENT OF LUBRICATION COSTS, ENGINES WITH MECHANICAL LUBRICATORS, SEPTEMBER, 1926

Engine	Mileage	Pints Superheated valve oil	Pints other valve oil	Total cost	Miles per pint	Cost per 1,000 miles
1,501	6,725	...	95	6.28	70.82	.9334
1,511	3,424	3	7	.68	34.24	1.9860
1,513	700	...	22	1.46	31.82	2.0857
1,690	3,929	...	26	1.72	151.11	.4378
1,691	334	4	7	.75	30.36	2.2455
1,692	9,893	43	66	7.49	90.76	.7571
1,693	2,652	...	31	2.05	85.53	.7730
1,695	816	...	9	.60	90.67	.7353
1,711	3,725	13	56	4.65	53.99	1.2483
1,712	3,672	36	53	6.12	41.26	1.6667
1,713	...	...	7	.46	...	...
1,714	408	3	9	.81	34.00	1.9853
1,715	3,963	23	45	4.65	58.28	1.1734
1,716	2,990	4	85	5.91	33.60	1.9766
1,717	3,815	...	82	5.43	46.52	1.4233
1,718	4,012	...	79	5.24	50.28	1.3061
1,719	3,346	...	58	3.84	57.70	1.1476
1,920	5,421	...	95	6.29	57.06	1.1603
2,000	3,862	...	55	3.65	70.22	.9451
2,001	3,323	...	57	3.78	58.30	1.1360
2,002	2,660	...	53	3.50	50.19	1.3158
2,003	3,338	...	53	3.50	63.00	1.0485
2,004	4,000	...	62	4.11	64.52	1.0275
2,005	4,343	...	74	4.90	58.69	1.1289
2,006	3,504	...	62	4.11	56.52	1.1729
2,007	2,062	...	53	3.50	57.71	1.1430
Total....	276,411	746	3,845	308.81	60.21	1.1172

of consumption on the basis of pints per mile operated and the cost per 1,000 miles operated. In this form the reports furnish an effective means of checking the performance of each locomotive both by comparisons with the performance of other locomotives in the same month, or by the performance of the same locomotive in successive months.

Back of the immediate cause of this road's accomplishments in reducing the consumption of cylinder oil



One of the Smaller Oil Distributing Points on the Atlantic Coast Line. Note Run-way Above Tanks for Rolling Barrels in and Out of Oil House

to \$1.1172 per thousand miles—all without injurious effects to the power.

The consumption of cylinder oil per engine and its cost per 1,000 miles are shown in the accompanying tabulation comprising a portion of the engines equipped with mechanical lubricators. While considerable variation is found in the performance of individual locomotives, partly owing to the fact that the record is based on the oil applied to engines as distinguished from the oil actually consumed during the period, the consumption of cylinder oil has been reduced in all instances and variation between locomotives has become less.

on mechanical lubricator equipped locomotives, however, is the general system of accounting for lubrication on this road, a system which is particularly interesting both because it extends not only to cylinder oil but to all other lubricants and because of the part played by the purchasing and stores department. Briefly it is a practice of the Atlantic Coast Line to purchase oil for lubricating locomotives and cars on contracts which provide for payment at a prescribed price per locomotive or car mile. Since these contracts cover all oil without exception and are so expressed as to render it attractive financially for the railroad to secure the greatest possible mileage from its lubrication, the purchasing and

detailed statement on the back of the form of the disposition is required.

A report similar to the above except for its being confined to two classes of oil is also required monthly by the purchasing department from car inspectors. In this case, an itemized statement is required of any oil issued to locomotives. At the close of the month each supply point must also submit an itemized statement of each locomotive served during the month showing the quantity of each kind of oil, grease and waste issued. This statement is employed in making the charges to various locomotives for oil used, but also operates as an important factor in controlling the use of oil by reason of the check it provides on the accounting. From these reports and a report of mileage obtained, the purchasing department prepares a summary report illustrated in Exhibit B, which shows the total amount of each kind of oil used, the miles of service per pint, and the cost per 1,000 miles, separated as between locomotives, passenger cars, freight cars and all other equipment.

The entire system, in which the special report on mechanical lubricator performance stands out as the latest development, is unusually complete in the extent to which it follows the disposition of oils and is distinctive for the important role played by the purchasing organization in the use of lubricants as well as their procurement. Under this system, in which it is empha-

INSTRUCTIONS FOR MAKING REPORTS

- 1- Balance brought forward from previous month.
 2- Must agree with the Gallies shown on Gallies Oil Bill for the month reported.
 3- Must agree with the Gallies of Nos. 1 and 2.
 4- Must agree with the amount issued as shown on Form 280.
 5- Must agree with the amount issued as shown on Form 280.
 6- Must agree with the amounts issued for Franchises as shown on their Form Oil, when expended.
 7- Must show amount issued to passenger train cars.
 8- Must show amount issued to freight train cars.
 9- Must show amount issued to work train cars.
 10- Must show amount issued to passenger stations.
 11- Must show amount issued for all other purposes, and in transit or by other means.
 12- Must show amount issued for all other purposes, and in transit or by other means.
 13- Shows the amount issued during the month or the addition of 4, 5, 6, 7, 8, 9, 10 and 11.

DETAILED STATEMENT OF No. 11.

[illegible]

Exhibit A—Back Side of Same Form for Reporting Irregular
Uses of Oil

stores and mechanical departments of this company have long agreed upon and jointly support through a series of self-balancing reports, the rule that all oil bought for lubrication must be charged to lubrication (not even excepting the oil used in repacking locomotives in round-houses or that used in repacking passenger and freight cars) and secondly the rule that all oil used as well as all oil purchased must be correctly accounted for. In administering the latter rule it is the aim in effect to check the use of oil as a bank checks its cash, the theory being that, on the one hand, a system of reports under which users of oil must strike a balance encourages carefulness in handling and, on the other hand, affords the sound basis of checking performance which is essential to preventing improper use and reducing waste.

The principal responsibility for the work falls on the supply stations which submit monthly to the purchasing agent a detailed accounting of all lubricants handled. The general balance sheet required monthly from supply stations is shown in Exhibit A. This form provides for separate reports of cylinder oil, superheat oil, car oil, rod cup grease, and journal compound and in each case calls for a statement of the amount on hand at the beginning of the month, the amount received during the month and the total amount available, together with the amount used on passenger cars, the amount used on freight cars, the amount issued to passenger trainmen, the amount issued to freight trainmen, the amount used on work train cars, the amount issued to engines, the amount issued for other purposes and the amount on hand at the close of the month. The several statements in this balance sheet must agree with the amounts shown on invoices and with the amounts issued on requisition, etc. In connection with this work, it is provided that where oil is used for other purposes than that for which it was issued, a

STATEMENT OF MILEAGE

Made by Locomotives, Passenger and Freight Cars, Amount Used, etc., of Valvo, Engine, Coach
and Car Oils, for Month of _____ 192__

[illegible]

Signed _____

Exhibit B—A Portion of the Summary Statement of
Lubrication

sized all lubricants are charged to lubrication, including those used in packing engines in roundhouses (usually charged to engine repairs), the cost of lubrication on the Atlantic Coast Line for the month of September, 1926, was as follows:

Service	Lubricants	Miles per pint	Cost per 1,000 miles
Locomotives	Valve oil	50.73	1.3211
	Car oil	26.63	1.1265
	Journal compound	121.74	1.2404
	Total		3.6880
All passenger cars		439.87	.0632
Freight cars		740.58	.0405
All cars		670.84	.0447

Northwestern Roads Plan Merger

*Executives of Northern Pacific and Great Northern meet
to form new 27,000-mile system*

NEWs that a new 27,000-mile railroad system was in the making was forthcoming on January 14 in the form of a statement that executives of the Great Northern and Northern Pacific had been considering plans for the merger of these two properties and would meet in New York on January 21 to formulate, if possible, definite plans. The Great Northern operates 8,200 miles of railroad and the Northern Pacific 6,700, making a total of 14,900 but they also own jointly the Spokane, Portland & Seattle, 550 miles, and the Chicago, Burlington & Quincy, 9,400. The Burlington has a majority stock interest in the Colorado & Southern Lines which (inclusive of the Fort Worth & Denver City and the Wichita Valley Lines) operate 1,800 miles. The Spokane, Portland & Seattle owns all of the stock of the Oregon Trunk, the Oregon Electric and the United Railways, the mileage of which three companies totals 362.

The plans insofar as at present outlined call for the control of the Great Northern and Northern Pacific by a single operating carrier which will control the two present companies by stock ownership and also by lease and which will operate the Spokane, Portland & Seattle. The Burlington is to continue to be separately operated as at present, control over it being exercised by the ownership of the 97 per cent capital stock interest now owned jointly by the Great Northern and Northern Pacific.

It is known that the plans have been informally discussed with the Interstate Commerce Commission. Their formulation is said to result from the community of interest between the Great Northern and Northern Pacific due to the ownership of a large stock interest in each by Arthur Curtiss James who is said to be the country's largest holder of railway stocks and who was recently reported as having acquired a working control of the Western Pacific. There is also a common interest resulting from the joint ownership of the Burlington and the Spokane, Portland & Seattle.

Statement by Howard Elliott

The news of the week with respect to the contemplated plans has thus far been almost exclusively in the form of official statements. A statement issued by Howard Elliott, chairman of the board of the Northern Pacific said:

"After the Transportation Act of 1920 was passed there was formed a so-called 'consolidation committee,' made up of members of the board of directors of the C. B. & Q., Northern Pacific and Great Northern roads, the legal advisers of the three companies and representatives of the banking firms advising with them about finances.

"Arthur Curtiss James, long time a director of the Northern Pacific, at the present time a director of the Great Northern and a very large shareholder in both companies, is chairman of the committee.

"Howard Elliott, chairman of the Northern Pacific, is the secretary.

"Frank L. Polk, a director of the Northern Pacific and a member of the firm of Davis, Polk, Wardwell, Gardiner & Reed, is counsel for the Northern Pacific.

"Walker D. Hines, a director of the Great Northern, is counsel for that company, and Bruce Scott, of Chicago, a director of the C. B. & Q., is counsel for that company.

"During the last six years much study and consideration by this committee has been given to the subject of consolidation,

and within the last six months Mr. Polk and members of his firm and Mr. Hines have prepared some plans and papers connected therewith which may permit a greater unification of the three properties than exists to-day.

"These papers are still in a purely tentative form, but it is expected that they will be discussed during the coming week by representatives of the three roads and arrangements made to complete them for submission at the proper time to the Interstate Commerce Commission and the shareholders of the interested companies."

Statements by Presidents Budd and Donnelly

More concrete details were included in a statement given out on January 18 by Ralph Budd, president of the Great Northern and Charles Donnelly, president of the Northern Pacific:

The Great Northern and the Northern Pacific have been considering for several years the question of still further unifying their interests, but consideration of the matter has not yet been completed. The plans now under discussion do not contemplate, as has been stated, the establishment of a mere holding company, but, in addition to control through stock ownership, look to leasing the lines of the Northern companies to a single operating carrier which it is contemplated will also directly operate the Spokane, Portland & Seattle,—a property already jointly controlled through stock ownership. Such unified operation will afford exceptional opportunities for improved service and for substantial economies promising to improve the aggregate net earnings of the railroads in the northwestern rate region which has made the poorest showing of any rate region in the country.

According to the plans now under consideration, the operations of the Burlington, which is also controlled by the Northern companies through equal ownership of over 97 per cent of the stock, will remain separate as at present. But the vesting in a single control of the entire 97 per cent of the Burlington stock will be favorable to the more decisive handling of the development policies of the Burlington than has been practicable when each Northern company voted separately and independently its half of the Burlington stock.

The steps that are now being studied will further to a still greater degree a community of interest which has long existed between the two Northern companies and which began when they jointly acquired control of the Burlington over 25 years ago and was enlarged when they built, and acquired the Spokane, Portland & Seattle system. The two Northern companies being thus permanently allied as to a mileage of more than 12,000 miles very naturally seek to strengthen and extend that community of interest and to make it more beneficial to their stockholders and more serviceable to the public.

As provided in the Transportation Act of 1920, the Interstate Commerce Commission several years ago made extensive investigations with a view to establishing a plan for consolidations of the railroads of the country into large systems. To serve as a basis for discussion, the commission made a tentative plan which separated the Great Northern from the Northern Pacific and the Burlington and grouped the Great Northern with the Chicago, Milwaukee & St. Paul. The Great Northern, Northern Pacific and Burlington all joined in urging the commission to put them in a single system. The commission reached no decision on this, since it concluded that the plan for general consolidation of the railroads throughout the country could not be immediately prepared and that additional legislation was desirable. As a result, consolidation in the strict sense has not yet become practicable as provided for in the Transportation Act.

On the other hand, the Transportation Act has provided for acquisition of control of one carrier by another through stock ownership and lease, without complete consolidation and the Interstate Commerce Commission has sanctioned extensive unifications by stock control and lease. It is this sort of a unification which is now receiving study by the two Northern companies, and such unification can only be lawful and effective if that commission finds it to be in the public interest.

As soon as definite conclusions can be reached, it will be the purpose of the Northern companies to explain the matter

fully and promptly to the governors and state commissions of the states through which the Northern lines operate.

The new company that takes over the operation of the Great Northern, Northern Pacific and Spokane, Portland & Seattle would operate a mileage of 15,000 and would control by stock ownership an additional 12,000 miles. The property investment of the lines operated would exceed one billion dollars. The Great Northern's outstanding preferred stock totals \$250,000,000 and the Northern Pacific's capital stock totals \$248,000,000. Both issues now pay 5 per cent dividends and both have about the same price in the stock market which combination of conditions it is believed will facilitate any contemplated exchange of stock.

Little Interest Shown in Consolidation Bill

WASHINGTON, D. C.

MEMBERS of the Senate committee on interstate commerce have displayed so little interest in hearings on Senator Fess's railway consolidation bill that there now appears to be very little prospect of any action on the subject at this session. Following the testimony of R. C. Fulbright, chairman of the legislative committee of the National Industrial Traffic League, on January 12 in support of the bill, the hearing was adjourned to the following day when Alfred P. Thom, general counsel of the Association of Railway Executives, and Ben B. Cain, general counsel of the American Short Line Railroad Association, were to testify, but on January 13 only three members of the committee appeared and an adjournment was taken for lack of a quorum.

Senator Watson, chairman of the committee, said that members took the position that it would be useless to listen to testimony on a bill that could not be passed at this session but that he would make a personal appeal to them to be present on the following day. On January 14 eight of the eighteen members of the committee were present part of the time but only a short session was held and no definite date was set for another hearing.

Mr. Thom made a general statement as to the need for additional legislation to make effective the policy of Congress that the railways shall be consolidated into a lesser number of strong systems, following in a general way the lines of his previous testimony before the House committee last Spring. He referred to the provisions of the law by which acquisition of control may be authorized as "a makeshift" which is not satisfactory to any one. Referring to press reports that plans were being worked out for a closer unification of the Great Northern, Northern Pacific and Burlington, Mr. Thom said he had had a letter from Hale Holden, president of the Burlington, pointing out that the terms of the present law afford an insufficient legal basis. Mr. Thom also pointed out that the Fess bill makes provision for the inclusion of short and weak lines in a system that may be proposed to the Interstate Commerce Commission, if the commission thinks it is in the public interest that they shall be included, and said that while there is some opposition among the railway executives to such a provision he had taken the position that Congress would not pass a bill that did not include it.

Asked about the number of railway executives that are opposed to consolidation legislation, Mr. Thom said

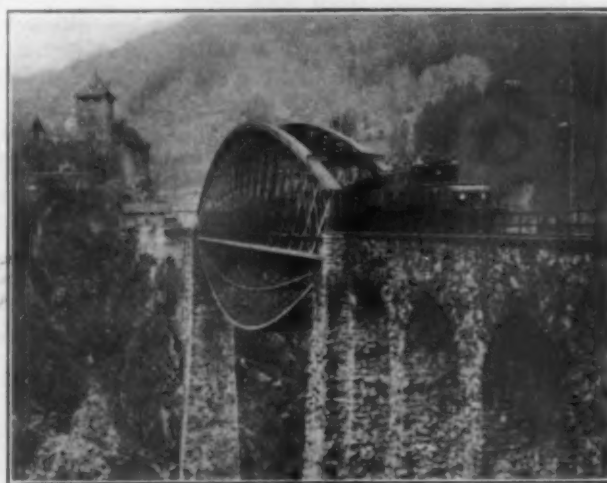
that L. F. Loree, W. H. Williams and Percy R. Todd had expressed opposition to the bill. He said Mr. Williams' apprehension was on the ground that the commission should not have power to require that a particular road should be included in a system. Senator Pine, of Oklahoma, said he understood that C. Haile, president of the Missouri-Kansas-Texas, is also opposed to the bill.

Richard Waterman, of the Chamber of Commerce of the United States, presented for the committee's record a statement which took a stand favoring the passage of the Fess bill.

A brief hearing was held on January 19, at which Mr. Thom continued his statement. To meet the objections of some of the railway executives, particularly Mr. Williams, he said, he suggested an amendment to the bill to prevent the Interstate Commerce Commission from prescribing the terms on which a company should be included in a proposed consolidation, except on request of the carrier. Mr. Thom said that in his opinion such an amendment is not necessary because a road could not be forced into a consolidation without its consent and that to fix terms for a road that would not come in would be a work of supererogation. He said that he would write to Mr. Williams and ask if such an amendment would meet his objection. Senator Hawes of Missouri had said that he understood some of the roads in the Southwest were opposed to the bill and might desire to be heard and he asked if Mr. Thom would not send the same letter to them. Mr. Thom replied that he thought the roads referred to would be covered by a letter to Mr. Williams.

Senator Couzens said he thought that some Senators are opposed to further progress in railway consolidation until some basis has been laid down for relating them to the valuation of the properties. Mr. Thom said that such combinations as are being effected under the present law are being approved by the commission without complete valuations and that the commission would not be bound in any way in fixing rates by the capitalization of a consolidated company but by its valuation after it was ascertained.

The hearing was to be continued on the following day. Meanwhile the House committee has been holding occasional executive sessions to consider the Parker consolidation bill.



An Electric Train on the Trisanna Viaduct, Austria

Missouri Pacific Operates Trains in Either Direction on Both Tracks

Light signals for right-hand and semaphores for left-hand running—Written orders reduced

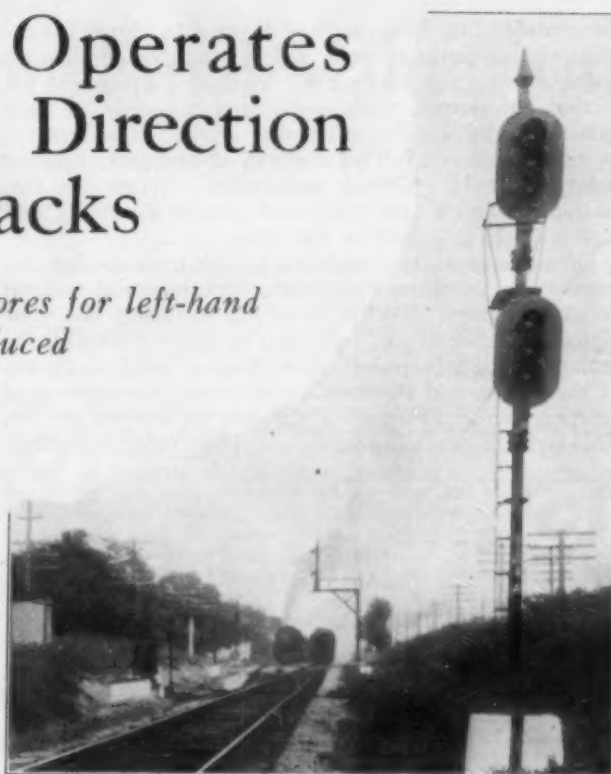
FOR the last three years the Missouri Pacific has been working on the realignment and second tracking of its line between Kirkwood, Mo., and Jefferson City, a distance of 111 miles upon which is handled all freight and passenger traffic of this road between St. Louis and the west. Double track with right hand running has been in use between St. Louis and Kirkwood, 12.9 miles, for about 44 years. The new work has been concentrated at different sections where the greatest relief from congestion could be secured quickly. For example, between Eureka, 30 miles



Single Westbound Location, Semaphore for Left Track and Light Signal for Right

from St. Louis, and Jefferson City, six separate projects were under way, four of which were placed in service in 1925 and two are well under way so that a total of 52.27 miles of double track is now nearly complete and the 1927 program includes other sections totaling 29.22 miles.

In order to utilize this new double track to the best advantage, trains are operated in either direction on both tracks, depending on traffic conditions, for the purpose of keeping all trains moving on main tracks rather than waiting on sidings for meets. In order to facilitate such operation it was decided to equip each track with automatic signaling in the same manner as a single track railroad; in other words, to provide signals for either direc-

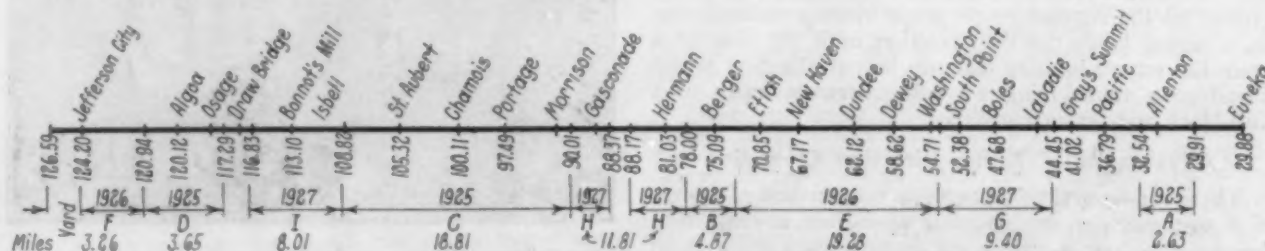


Westbound Freight Train Approaching West End of Double Track at Allentown as Eastbound Passenger Train Passes Remote Control Switch in Foreground

tion on each track. In order to eliminate any confusion between signals for one direction on the two tracks color-light signals are employed for right hand and semaphore signals for left-hand running. In view of the fact that the single-track line had been equipped with direct current semaphore signals of comparatively modern design in 1904 and 1917, it was practical to use all the semaphore signals and considerable of the balance of this apparatus for the new signaling of the double track.

Layout of Signaling and Method of Operation

As immediate relief was necessary the first problem was to utilize the sections A, B, C and D, as shown in the sketch, which were completed in 1925. Where practicable mechanical interlocking plants were employed to operate the switches and signals at one end of a piece of double track while the other end was operated by remote control switch machines controlled from the same interlocking station or the nearest telegraph operator's office. On one of the sections a double set of crossovers was installed in approximately the center, these crossovers being interlocked, and the operator at that point controls movements of trains on either track and operates both ends of the double track with remote controlled switches. Movements over the double track, when under



Section of Line Where Reverse Operation on Double Track Is Utilized to Increase Traffic Capacity

the control of the operator, are directed by signal indication without written train orders, thereby eliminating train stops to pick up orders. With this equipment the sections of double track were used not only as long passing tracks but also as running tracks for movements in either direction. This method of operation assisted considerably in relieving congestion. When the two sections *F* and *E* are completed greater flexibility and capacity will of course be available.

On the completed double track each track is signaled to meet the conditions of grade, curvature and spacing between stations. When practical to bring the four signals together at one location a bridge is provided, the semaphore signals for left-hand running being on the top of the bridge and the color-light signals for right-hand running being mounted on the face of the bridge leg. This arrangement allows a sufficient difference in location



Semaphore Signals for Left Hand Running on Top of Bridge and Light Signals for Right Hand on Side of Bridge Leg

to prevent any confusion in signal indication. The signals, which are electrically lighted, are controlled by the approach of a train so that only one light indication appears before a train. If two trains are running side by side in the same direction the difference in the types of indications as well as their relative locations will prevent any confusion of indications. In all cases the signal governing a movement over a track is located immediately to the right of or over the right rail of the track governed.

The method of locating the signals to give the protection required is shown in the accompanying sketch, illustrating layouts at the end of double track and at one of the new center passing tracks. The signals are controlled on the regular single track overlap method, that is, a signal holds the stop position until the rear of a train has passed braking distance beyond the next signal in advance, thus giving a spacing between trains of a full block and braking distance.

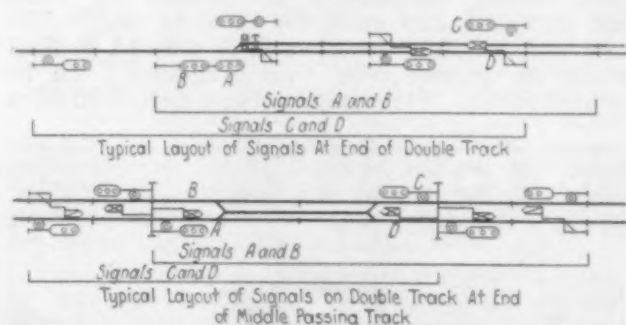
Advantages of Either-Direction Operation

There are several advantages in this method of operation over regular double-track operation, among them being that a freight train is not detained on a siding to be passed by a passenger train, except where opposing trains

are using the opposite track. Frequently, on the stretch of track having double crossovers in the center, three or more trains are kept moving while being met or passed. At stations where the community is practically all on one side of the railroad, the passenger trains may be routed on the left hand track, permitting freight movements to be made on the opposite track at regular speed without any danger or delay to passengers. Should one of the tracks be blocked no special precautions are necessary to make movements in either direction on the opposite track. Local trains running in either direction may set out their industry loads without blocking both main lines in making this move. Other advantages are apparent to operating officers.

Pole Line and Power Supply

A new signal pole line was built with 35 creosoted pine poles to the mile. Oregon fir crossarms were used. Two No. 4 stranded aluminum cable conductors for the single-phase 4,400-volt feeder system were supported on the top 4-ft. crossarm. The lower 10-ft. crossarm carried



Method of Locating Signals to Provide Proper Protection at End of Double Track and at a Center Passing Track

the No. 12 bare hard drawn copper line wires for the signal circuits.

The color-light signals used on this installation are the Handlan-Buck type, using 25-watt, 8-volt lamps. The old semaphore signals are the Union Switch & Signal Company's Style-B, the Federal Signal Company's Style 4-A and the General Railway Signal Company's Style 2-A. All construction work was handled by the Missouri Pacific signal forces, working under the jurisdiction of the signal engineer's office.



Ewing Galloway

A Russian Yard

Delaware & Hudson Final Valuation

Final figure is approximately that of tentative valuation

THE Interstate Commerce Commission on January 13 made public its final valuation report on the Delaware & Hudson and subsidiary properties, finding the final value for rate-making purposes, as of June 30, 1916, to be \$95,834,979 for the property used for carrier purposes. The commission's figure for the property wholly owned and used was \$57,195,100, that for the property owned but not used, \$37,312, and that for the property used but not owned (leased), \$38,639,879.

The commission also found the final value for rate-making purposes of the Greenwich & Johnsonville to be \$901,912, for property owned and used; that of the Cooperstown & Charlotte Valley to be \$26,000 for property owned and used and \$515,427 for that used but not owned; and that of the Wilkes-Barre Connecting, owned and used, to be \$1,468,089.

The figures for the Delaware & Hudson are approximately the same as those of the tentative valuation, which was declared final as corrected as the result of evidence submitted by one of the commission accountants at the hearing. The company at the hearing declined to submit evidence in support of its protest but filed a motion asking the commission to rescind and withdraw its orders on the ground that the tentative valuations did not comply with the law.

Commissioner Woodlock, in a concurring opinion, and Commissioner Eastman, in a dissenting opinion, refer to the final figure as having been made up of cost of reproduction less depreciation at 1914 prices, plus the value of lands at valuation date, plus working capital and about \$8,000,000. The outstanding capitalization as of valuation date was \$106,127,600, and the investment in road and equipment, as stated in the books, was \$68,642,567. Extracts from the opinion accompanying the order are as follows:

By our orders entered October 2, 1925, we denied the motions of the carriers to rescind and withdraw the tentative valuations of their properties, subject to the right of the carriers and others interested to present to us their views concerning pertinent questions of law and evidence in support of such matters of fact as they wished to have considered in connection with their protests.

Pursuant to which a further hearing was held on October 23, 1925, at which the carriers refused to proceed with evidence. The carriers took the ground that the tentative valuations served did not comply with the law. Pending the ultimate determination of the questions thus presented, the carriers declined to offer evidence or proceed further before us in these matters. Upon the argument, carriers' counsel took the position that the burden of proof and the burden of proceeding with the evidence was upon the commission. As authority for this contention the carriers cite the decision of the Supreme Court of the United States in *Delaware & Hudson Co. v. U. S.*, 266 U. S. 438, as holding that a tentative valuation of a carrier's property is no more than an *ex parte* appraisal without probative effect. They claim that there is no record upon which any final valuation orders can be based.

Neither the facts nor the decision in that case warrant the conclusions drawn by the carriers. The hearing on the carriers' protest is a proceeding preliminary to the issuance of a final valuation, and is for the purpose of affording an opportunity to the protestant to bring to our attention facts or circumstances which it deems warrant a modification of our tentative valuation. Parties to valuation cases are, moreover, permitted, under our order of May 13, 1924, to inspect, in advance of the hearing, the preliminary data upon which the conclusions in the tentative valuation are founded, but which on account of their bulk are

not embraced in the tentative report, and are thus afforded a fair and reasonable opportunity to prepare themselves to point out at the hearing any errors which may exist. A tentative valuation served upon the parties to a proceeding represents our tentative conclusions with respect to the matters therein contained, subject to modification upon proper proof of error by the carrier or other parties interested.

We are required by the act to receive and consider evidence in support of a protest before the tentative valuation is made final. It is apparent that it is not within the contemplation of the act that we should require evidence in support of our tentative conclusions, certainly not prior to the submission by a protestant of evidence tending to show that the conclusions are erroneous. The carriers having refused at the hearing to proceed with their evidence, their protests as to matters of fact which depend upon evidence for their substantiation are unsupported.

The Carriers' Protests

In their protests against the tentative valuations of the various railroad properties involved, as well as in their respective motions to rescind and withdraw said tentative valuations, the carriers allege seven errors of law on the part of the commission, the substance of which may be summarized as follows:

1. That the use of price levels for 1914 and earlier, in obtaining 1916 valuations, resulted in such discrepancies as to vitiate those valuations;
2. That there were omitted from the valuations properties known to exist, said items being the same properties classified in the tentative valuations as trackage rights;
3. That there was a failure to find original costs;
4. That there was an omission of findings on other values and elements of value;
5. That there was used a formula to determine working capital in lieu of any finding as to the amounts actually owned or used;
6. That there was an omission of analyses and reasons; and
7. That there was a failure to show the values of the properties in each of the several states.

On all of these questions the carriers have stated their views in oral argument and by briefs which fully set forth their views.

The legal questions set out in the seven preceding subparagraphs will be treated seriatim in the corresponding paragraphs next following.

Prices as of 1914

In cases heretofore decided we have clearly stated our reasons for applying to the engineering inventory normal prices as of June 30, 1914, determined upon consideration of prices for railroad construction which prevailed during a period of years ending with that date. No evidence or convincing argument has been advanced in the instant case to persuade us to depart from this course.

The application to the engineering inventory of normal 1914 prices fully meets the requirements of the law and imposes no hardship upon the carrier. Carriers would derive no benefit were normal 1916 prices substituted for normal 1914 prices. Both of these years are past, and nothing would be gained by the adoption of normal 1916 prices, inasmuch as no use is being made of the value herein reported for fixation of rates or other purposes enumerated in the interstate commerce act. If 1916 prices had been used, it would to-day be necessary to adjust them, just as it is necessary to adjust 1914 prices by application of price trends or otherwise, if present use is to be made of the findings in carrying out the provisions and requirements of the interstate commerce act.

The commission is required to keep itself advised and informed of any changes in value and to revise its valuations from time to time in accordance with such changes. Pursuant to the act we will readjust final valuations so as to make them current as contemplated by it. Pending specific use of the finding in the valuations as made final no advantage accrues to the carrier from the application and use of normal 1916 prices, nor does the carrier suffer any detriment through the use of normal 1914 prices. There is full recognition under existing law of the necessity of giving consideration to the price levels obtain-

WASHINGTON, D. C.

ing at the time the fixing of the single-sum value hereafter becomes necessary.

Alleged Omitted Property

The carriers urge with great insistence that they should be allowed a value for tracks in which they have a restricted right of user but which are owned and jointly used by other carriers. In *Texas Midland Railroad, supra*, we said at page 21:

When it is borne in mind that many railroads are not operated exclusively by their owners, but that certain portions thereof are used by one or more carriers by virtue of trackage rights, etc., it is apparent that duplication of values for such jointly used property will result unless a proper course of procedure is pursued.

Accordingly we have laid down the rule that where property is owned by a common carrier and is used by it jointly with another carrier or carriers for common-carrier purposes, the property is included in detail in the inventory of the owning carrier and reference is made in each report to its use by the respective carriers. That rule has been applied in the instant cases.

Omission of Findings of Original Costs

The original cost to date of the properties as a whole of the carriers herein is not reported, owing to the inadequacies of the carriers' records, this fact being stated in the tentative valuations. The carriers protest and argue at length these omissions. At the hearings on the protests full opportunity was afforded protestants to supply facts which would have enabled us to state original cost, but this the carriers elected not to do.

Other Values and Elements of Value

Paragraph (b) of section 19a requires that "The Commission shall in like manner ascertain and report separately other values, and elements of value, if any, of the property of such common carrier." The final-value clause in each of the tentative valuations served as above contains this language: "A careful consideration of all facts herein contained, including appreciation, depreciation, going-concern value, working capital, and all other matters," and this is followed by the statement that "No other values or elements of value to which specific sums can now be ascribed are found." Thus we have made plain that careful consideration has been given to every element that diligent investigation discloses. If there are elements of value appropriate to be reported under paragraph (b) and which were not discovered by us it was within the power of protestants to have made disclosure of same. This they made no attempt to do, and no figures have been submitted to us by the carrier as proper to be set opposite "other values or elements of value." Our tentative valuation of the properties of these carriers, each considered as a whole, includes all elements of value of the properties as they existed on valuation date so far as we could ascertain them.

Working Capital

The carriers object to the application of the method used by us for ascertaining the amount of working capital necessary to meet the requirements of the carriers and insist that the cash and material and supplies on hand at date of valuation should be determinative.

Under the law only such cash and material and supplies as are used for common-carrier purposes may be included in the value fixed for rate-making purposes. And after proper allowances have been made for the proportion of such balances as may be applicable to other than common-carrier service, the remainder or balance on any particular date may not be representative of a normal condition and may include stock held for additions and betterments and new construction, as well as obsolete and scrap material. We have, therefore, in the case of material and supplies, given consideration to the requirements in the way of a stock for operation and maintenance.

In the case of cash, consideration has been given to the volume and frequency of receipts and payments and the various factors that have effect upon the elapsed time before the revenues from each class of service are in hand and available for the payment of expenses incurred in such service. These factors disclose how much cash the carrier has actually put into use as working capital to cover its common-carrier service operations. The amount of cash on hand on a given date has no necessary relation to the cash so used by any carrier. The cash on hand is the reservoir into which flows the cash received from all sources and from which cash is drawn for all purposes. Further, the cash on hand and other current asset and liability items are a matter of financial status as of that particular date, while the cash working capital is a matter of the changing status from day to day of receipts in hand available to meet maturing payments and the amount of such payments falling

due. Finally, that an amount of cash is on hand on date of valuation is not necessarily conclusive that it is in fact working capital.

Appendix 3 of the report in *Texas Midland Railroad, supra*, is a complete analysis of the methods pursued by the Bureau of Valuation. It is applicable to these cases and may be considered in connection herewith. It is not necessary that this analysis in detail be reproduced as a part of each valuation. Its publication as aforesaid and reference thereto herein are a compliance with the valuation act.

The carriers protest and argue that we failed to find the value of property in each state. The valuations as served contain tabulations and statements by states showing all fixed property. This the act requires us to do. That property which has no situs does not fall within the requirement, for, as said in *Texas Midland Railroad, supra*, at page 159: "The Commission is not required to create, nor would it be justified in attempting to create by any arbitrary rule, a location which does not in fact exist," as, for instance, locomotives and other equipment; nor is the going-concern value which appears in the property capable of allocation by states.

Orders will be entered declaring final our tentative valuations as corrected. The final values reported are for rate-making purposes.

Woodlock Concurs

Commissioner Woodlock in concurring said:

A final value is found for the total used property of the system comprised in the report of \$95,834,979. As has been the rule of the commission in the case of all preceding reports of final value, no statement of the method by which it has been arrived at is made. This sum presumably represents a general judgment upon all the facts of the case. I observe, however, that it is equivalent to the sum of three factors, viz: cost of reproduction less depreciation (at 1914 unit prices), value of lands at valuation date, and working capital plus an amount of a little less than \$8,000,000. If the inventory of physical property had been priced at 1916 figures, in my judgment the addition of these three factors, together with the excess above mentioned, would have represented the full "value for rate-making purposes" as of valuation date. In other words, it is my belief that, subject to correction for special circumstances that may be found to exist in the case of individual properties, the sum of money that would result at any given time from addition of reproduction cost less depreciation, land values, and working capital, with some allowance for "intangibles," would represent the kind of "present value for rate-making purposes" that the courts are now recognizing. I therefore concur in this report, believing it to be in accord with the law and with the interpretation placed by the highest authority upon the law at this time.

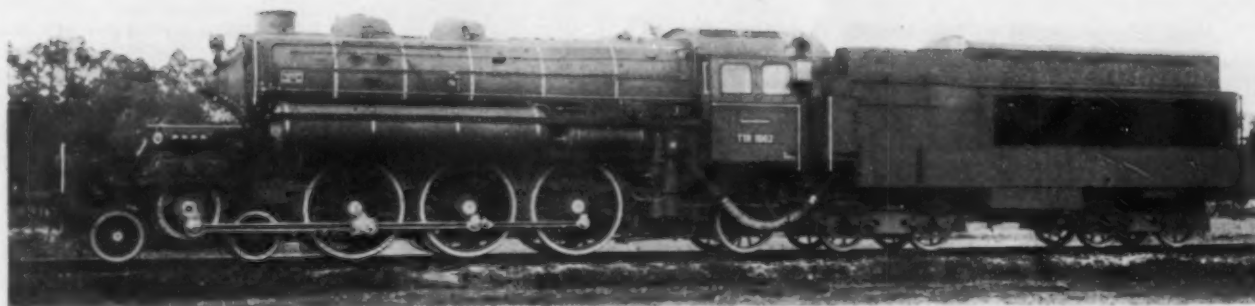
Eastman Dissents

Chairman Eastman in dissenting said:

The value for rate-making purposes is reached in this proceeding by methods to which I do not subscribe, and is a higher value than I would find. The reasons for my views upon this subject of valuation have been sufficiently indicated in separate expressions of opinion in *San Pedro, Los Angeles & Salt Lake R. R. Co.*, 75 I. C. C. 463, 523-567; *Atlanta, Birmingham & Atlantic R. R. Co.*, 75 I. C. C. 645, 676-678; *Petition of National Conference of Valuation*, 84 I. C. C. 9, 20-21; *Florida East Coast Ry. Co.*, 84 I. C. C. 25, 38-40; *Kansas City Southern Ry. Co.*, 84 I. C. C. 113, 140-144.

As a matter of interest I note that the carrier reported that the original cost of a portion of the land used for carrier purposes which it owns or leases was \$5,494,578.83, and that it is found that \$4,803,516.45 of this amount is supported by the accounting records, the remainder not being so supported. The value of the same lands at valuation date is found to be \$12,390,099.65, and apparently full weight is given to this latter sum in the final value. It will also be noted that the carrier received aids, gifts, grants, or donations, not repaid, amounting to at least \$1,350,000, but that this fact is given no weight in the final value. As the concurring commissioner states, that value seems to be based upon the cost of reproduction less depreciation at 1914 prices, plus the value of lands at valuation date, plus working capital, plus an amount of about \$8,000,000 of unknown derivation.

THE FREIGHT TRANSFER STATION of the Pennsylvania at Harrisburg, Pa., has on its payroll 23 employees who have been employed there steadily since the day the transfer was established, December 15, 1911. The *Pennsylvania News* prints a picture of these men, in a group, as a memento of the fifteenth anniversary of their service. When the transfer was opened the number of employees was 89; today there are 260.



Turbine Locomotive Built for the German State Railways by I. A. Maffei; Munich, Bavaria, Germany

Turbine Locomotive for the German State Railways

Pacific type built for heavy express service to handle trains at an average speed of 62 m.p.h.

By G. J. Melms

Consulting Engineer, Paris, France

THE endeavor to develop the steam locomotive to a high state of efficiency has resulted in the German State Railways placing an order for a second turbine locomotive from I. A. Maffei, Munich, Bavaria, Germany. This locomotive, which was recently delivered, develops 2,500 hp., and is designed to haul heavy express trains at an average speed of 62 m.p.h. and at a maximum speed of 78 m.p.h. The general design and construction of this locomotive has been made as far as possible similar to that of the standard Pacific type locomotives recently adopted by the German State Railways.*

Following the same general trend in the design of the standard locomotives, the construction of all parts of the new turbine locomotive is of the greatest simplicity and they are easy of access.

It was left to the builders and principally to the chief engineers, C. Imfeld and Mr. Ludwig, to comply with the required operating conditions and the following description may serve to show the reader how far the problem has been solved.

The turbine and the electric locomotive naturally have many features in common, one of the most important being a smooth starting tractive force. Having a higher adhesion, a greater proportionate tractive force can be utilized than is possible with a reciprocating type locomotive and besides the reciprocating and other parts can be dispensed with.

The greater axle loads permit an increase in the total weight of the locomotive, which made it possible for the builders to increase the boiler pressure to 330 lb. Because of the high pressure and the saving of steam by the condenser, the dimensions of the normal locomotive boiler were considerably reduced. Shortening the boiler length and reducing the smoke box dimensions created additional space on the front end of the locomotive, making room for the turbine and the reduction gearing.

Similar to the electric locomotive, the turbine gear

drive is so arranged that the power of the turbine shaft is transmitted by two pinions through reduction gearing to a jack shaft and from this shaft to the main connecting rods and the six-coupled driving wheels.

General Description of the Maffei Locomotive

Two surface condensers are located on each side of the boiler. The exhaust piping to these condensers pass through the center supporting yoke of the boiler. A suction draft fan, directly connected to a small turbine, is fixed to the inner side of the smoke box door, and serves to eject the waste gases. The air of the condenser is removed by two single-stage air suction steam ejectors. The condensate water is removed by a pump directly connected to a piston feedwater pump. A Westinghouse air compressor and small turbine-driven dynamo for electric lighting, etc., are also provided.

The tender has been considerably increased over the standard length, the forward part having storage space for fuel and feedwater. Adjoining this is a small space for the turbine which drives the air fans and the cooling water pump. The remaining portion is occupied by the cooling installation, which consists essentially of a spray cooler. The water flows downward over flat metal sheets while the cool air is admitted through the sides of the tender and passes over the flat metal surfaces exposed to the spray, finally being ejected by two fans placed horizontally in the roof of the tender.

COMPARATIVE WEIGHTS OF THE TURBINE AND STANDARD PACIFIC TYPE LOCOMOTIVES OF THE GERMAN STATE RAILWAYS

	Turbine locomotive	Standard Pacific type locomotive
Weights in working order:		
On drivers.....	132,000 lb.	132,800 lb.
Total engine.....	229,000 lb.	249,000 lb.
Total tender.....	150,000 lb.	148,000 lb.
Total engine and tender.....	379,000 lb.	397,000 lb.

The turbine locomotive, considered alone according to the figures comparing it with the standard Pacific type, is the lighter of the two, so the weight of the con-

*A description of the standard locomotives of the German State Railways was published in the November 6, 1926, *Railway Age*, page 897.

densing apparatus results in less weight than that of a standard locomotive.

It is evident that the cost price of the turbine locomotive will be higher than the reciprocating locomotive, but the latter has the advantage of a century of experience in production which can only be overcome as turbine locomotives increase in number. Of the coal consumed, 15.6 per cent of the total heat can be utilized at the crank pins when the locomotive runs at the rate of 43.5 m.p.h., whereas the express reciprocating type locomotive of standard construction will give a value of seven to eight per cent.

It has been estimated that one horsepower at the jack shaft will absorb 7,280 B.t.u., or with coal having 12,780 B.t.u., 1.26 lb. of coal per horsepower (including the steam used for the auxiliary machinery). In the winter, the total net efficiency will be increased, due to the train heating, and it is then expected to increase up to 20 or 22 per cent.

The feedwater of the turbine locomotive is forced through two feedwater heaters placed in series, and is heated by the exhaust steam from the auxiliary machines up to a temperature of about 260. deg. F. It must be admitted that by pre-heating the air for combustion, or by increasing the feedwater heating installation, further saving can be obtained.

The Main Turbine and Reduction Gear

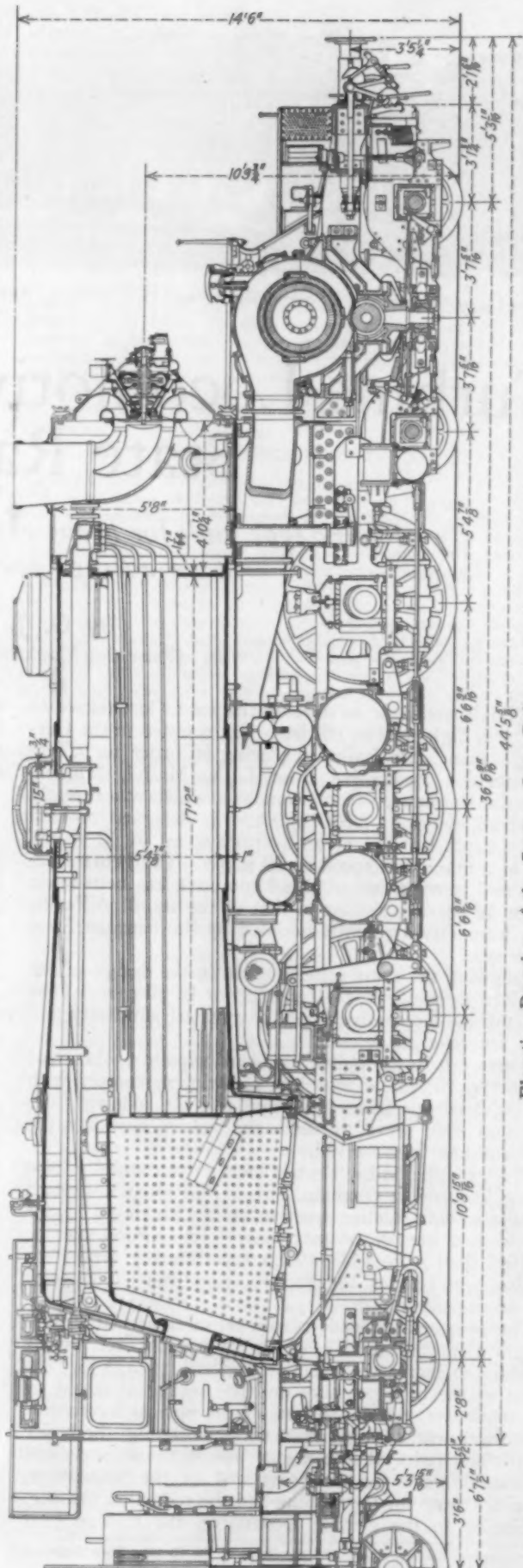
The turbine is situated above the engine truck with its axis at right angles with the center line of the locomotive and transmits its power by means of a double reduction gear through connecting rods to the driving wheels. The forward drive and the backward drive turbines, are enclosed in the same housing. At a locomotive speed of 78 m.p.h. the turbine shaft runs at 8,800 r.p.m., which is reduced through a gear ratio of 1 to 24.

The forward turbine consists of two discs in the high pressure end, each containing one row of blades at the rim, followed by an action wheel and five reaction wheels of suitable diameters. The end thrust is counter-balanced by a balance piston at the high pressure end.

The backward drive turbine consists of a velocity disc of smaller diameter having three rows of blades revolving in a vacuum while the forward drive turbine is in action. The steam expands in the nozzles of the backward drive turbine from admission to vacuum and exerts but little reaction effect on the blading. The housing of the backward drive turbine is located inside of the main turbine and its construction provides a guide channel so arranged that the exhaust from both turbines is led to the same outlet without interfering; that is, it prevents the steam from one from entering the blading of the other. It is evident that the backward drive turbine cannot produce the same effect as the forward, but this is a secondary question for an express locomotive.

In case the condensers should fail to function, a safety valve prevents any undue pressure on the turbine vacuum pipe line and in the condensers. The safety valve will come into action if the cooling apparatus fails to operate, whereas in case of an accident to the condensate pump, the steam will continue to be condensed and the condensate in by-passing the condensate pump, will then be forced into the feedwater reservoir on account of the high pressure. In this case, the steam injectors can be placed in service.

In order to insure good efficiency even at low load, the forward as well as the backward drive turbines are regulated by four single nozzles. The two cast steel admission chambers attached to the two sides of the upper half of the casing have an independent pipe connection



Elevation Drawing of the German State Railway's Turbine Locomotive

to the superheated steam chest. The valves, provided with nickel seats, are self-closing with positive openings and are connected together by means of a regulator shaft and bevel gears. They can be directly manipulated by the reverse gear control in the cab. A dial and pointer indicate the position of the various valves. The gear can be conveniently handled in a manner similar to that used on most steam locomotives in Europe.

The Condensers

The two condensers are connected in parallel for both the flow of steam and of water. The cooling water flows in four streams, so that a high rate of flow is obtained. A separate group of cooling tubes for the exhaust air is provided. Suitable care in the construction of the joints and the mode of adjustment of the tubes to prevent sagging has been taken and the tubes can be inspected or removed without having to remove the condenser from the locomotive.

The condensate flows from the condensers to an intermediate tank provided with a float gage. From here it is drawn off by the condensate pump which is directly connected to the feedwater pump. These pumps are surrounded by a water chamber connected to the feedwater reservoir in the tender. The condensate pump can only

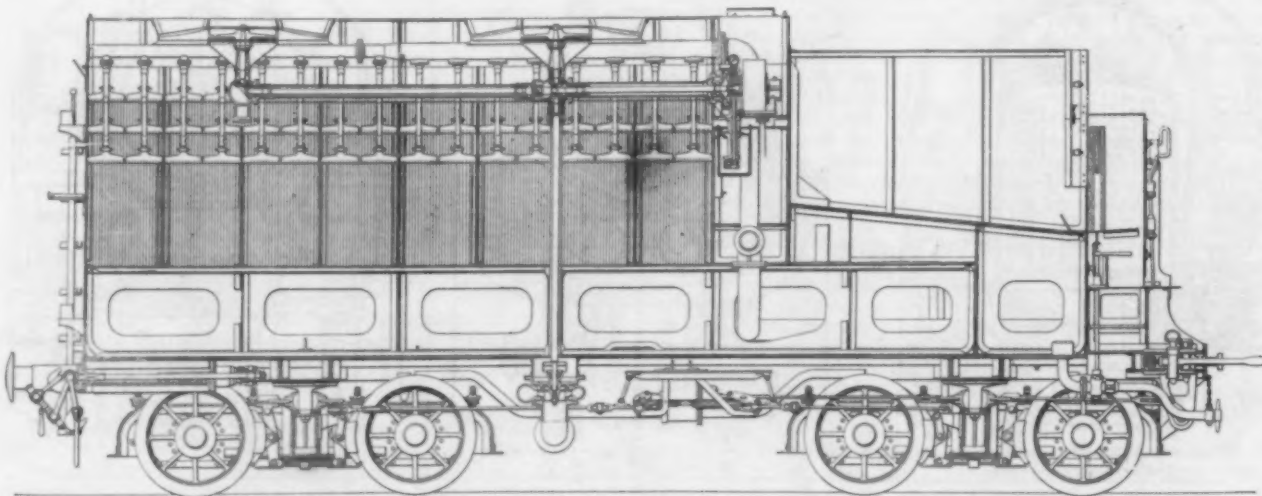
coming from the condensers at from 110 to 120 deg. up to 190 deg. or 200 deg. F. The water is then forced to the second feedwater heater to which steam is admitted at about 37 lb. gage pressure. This heater receives the exhaust from the turbine connected to the cooling water pump on the tender and part of the time it also receives the exhaust steam from the suction draft turbine, which reheats the water up to a temperature of about 260 deg. F. Any superfluous steam passes through a regulating valve to a low pressure stage of the main turbine.

In order to save steam under all conditions, a small additional condenser is placed between the main condensers, in which the non-condensed steam from the feedwater heater is condensed and the water flows back to the reservoir.

Two detachable rubber hose equipped with self-adjusting couplings, conduct the cooling water to and from the tanks of the tender. Live steam flows from the engine to the tender through a combination metal hose, located near the center line of the locomotive.

New Design of Suction Draft Is Provided

A novel construction was created in order to solve the important question of suitable draft in the smoke



The Tender Showing the Location of the Condenser and Auxiliary Equipment

work up to atmospheric pressure; the feedwater pump forces water out of the reservoir into the boiler.

A by-pass in the feedwater pipe enables the engineman to allow the feedwater pump to run without load for a time, in order to enable the condensate pump to work independently. The speed of the pump can be controlled from the cab. In case the speed of the pump is not sufficient, the water in the intermediate tank is raised and the float gage indicates this in the cab. This warns the engineman to operate the pump at a greater speed. But, as the capacity of the condenser pump is about 20 per cent greater than the feedwater pump, this indication will not often occur. The air in the condensers is ejected by two steam ejectors, the exhaust steam from which is condensed in the feedwater heater.

The Feedwater Heater

The feedwater heater tanks are located in the rear of the condenser. The steam in one is under atmospheric pressure. This heater absorbs the exhaust steam from the feedwater pump, the air compressor, the two steam ejectors and the dynamo turbine, which heats the water

box. As may be seen from the drawings, a small high speed turbine is located in the door of the smoke box, which operates with superheated as well as with saturated steam. It is directly coupled to a draft fan of special design. This fan is extremely simple in design and form, made of non-rusting Bohlsteel, and eject the gases from the smoke box.

The draft fan operates at a speed of from 6 to 7,000 r.p.m. This unit and its housing form the projecting point of the door which receives a strong cooling effect on the front bearing and the oil chambers directly adjacent, while the locomotive is running. The turbine casing has ribs cast on the outside to cause the air to circulate around the turbine and also to cool the bearings. The admission valve of the turbine is controlled directly by the engineman in the cab. The exhaust steam from the turbine flows into the second feedwater heater, and is controlled by a valve that admits the steam at a pressure of about 37 lb. per sq. in. gage. In case this heater is fully charged, the steam is turned into a low pressure stage of the main locomotive turbine.

This draft system was thoroughly tested and it was

found that the desired pressures could be obtained with high efficiencies. It has the advantage of high speed which enables it to be coupled up directly to a high speed turbine. The speed need only be adjusted by the throttling valve and it will remain constant, regardless of variations of the gases or other conditions. No extra regulating devices such as a safety cutout, etc., are necessary.

The Tender

The tender has an overall length of 37 ft. 8 $\frac{3}{4}$ in. and is mounted on two four-wheel trucks. A water tank having a capacity of 1,138 gal. is located in the forward end and directly above it is the coal bunker having a capacity of 6 tons. A partition is inserted between the coal bunkers and the cooling compartment for the turbine driving the feedwater pump and the fans for the cooling compartment, to which access is provided from the top.

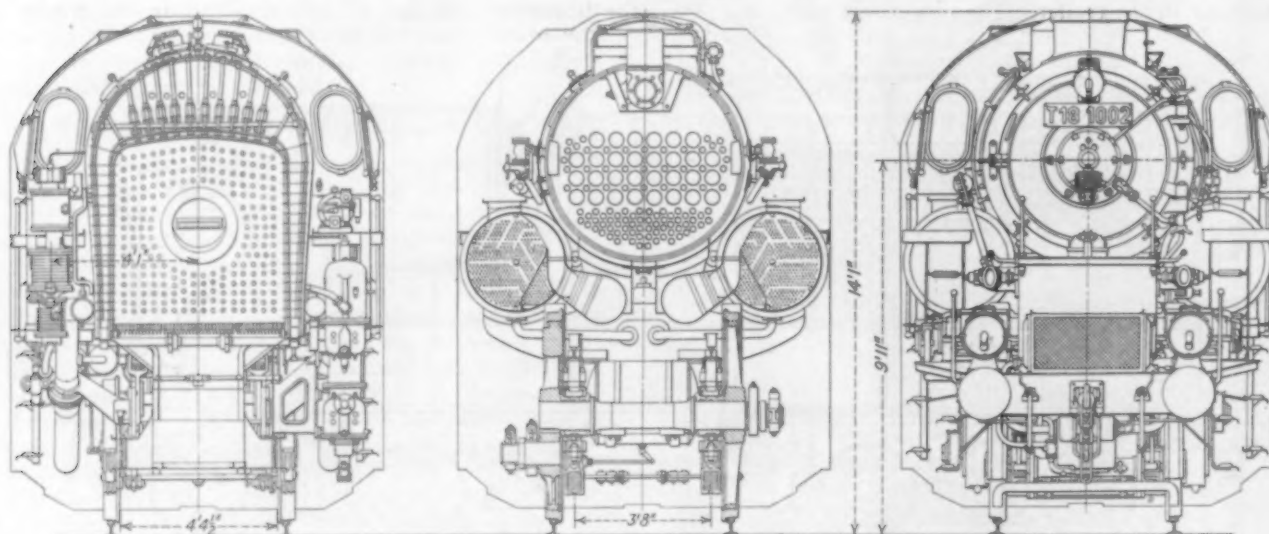
The turbine is geared to a main horizontal shaft from which the power is transmitted by means of bevel gears, to the vertical shafts of the fans and the cooling water pump. It operates at 6,000 r.p.m., whereas the cooling

partment for recooling is subdivided into various cooling elements. These elements, of which there are 48, consist of closely packed perforated sheet copper which are separated by pass pieces and held together by bolts. The air passes between the copper plates in an opposite direction from the downward flowing cooling water, which flows in sheets, thus avoiding drop formation.

The experiments proved that this construction insures the greatest economy of water and that the loss of water was not any greater than the evaporation determined by calculation. It is evident that with the cool water, the temperatures mentioned can create a satisfactory vacuum. At full load the locomotive has an average vacuum of from 80 to 90 per cent which increases at a lower load. It is possible under these circumstances to maintain a lower water temperature in the reservoir and begin the next period of heavy work with a better vacuum.

The Heating and Lighting Systems

The exhaust of the auxiliary turbine on the tender, furnishes the necessary steam for heating the train at various pressures, according to temperature or other



Cross Sections Through the Firebox, Smokebox and Elevation Drawing of the Front End

water pump and the two fans have a speed of 1,000 r.p.m. The fans require 13 hp. and exhaust 882.5 cu. ft. per sec. The pump absorbs 23 hp. and delivers 12,380 cu. ft. per hour.

The rear and greater part of the tender is occupied by the cooling installation, but the space thus used is only about one tenth of that usually required for stationary installations. Extraordinary conditions being present made it imperative to find new methods and apply new principles. It was found by actual experiment to be very important to prevent drop formation, as a drop of water is carried away by the current of cooling air. The cooling air must follow a line of least resistance in order to save power for ventilation; vibration must be eliminated and all parts must be so located as to be easy of access. It is not possible to cool by means of a blast of air on account of the great amount of space required.

It must be considered that from about 16 million to almost 18 million B.t.u. per hour will have to be taken care of, a figure which is too great for air ventilation only. Air is admitted on both sides of the tender, passing through air deflectors and is ejected by means of two horizontal ventilators placed in the roof. The com-

partments for recooling is subdivided into various cooling elements. The turbine receives boiler pressure and the exhaust steam flows to the second feedwater heater drum in warm weather. Only that portion of the exhaust steam which is not used for train heating is supplied to the feedwater heater in cold weather. A small turbo-dynamo generates the necessary electric current for lighting.

TABLE OF DIMENSIONS, WEIGHTS AND PROPORTIONS OF THE TURBINE LOCOMOTIVE FOR THE GERMAN STATE RAILWAYS

Railroad	German State Railways
Builder	I. A. Maffei, Munich, Germany
Type of locomotive	4-6-2
Service	Express
Main turbine speed at 74.6 m.p.h.	8,800 r.p.m.
Ratio of main reduction gear	1 to 24
Weights in working order:	
On drivers	132,000 lb.
On front truck	66,000 lb.
On trailing truck	31,000 lb.
Total engine	229,000 lb.
Total tender	250,000 lb.
Total engine and tender	379,000 lb.
Wheel bases:	
Driving	13 ft. 1 $\frac{1}{2}$ in.
Total engine	36 ft. 6 $\frac{1}{2}$ in.
Total engine and tender	69 ft. 9 in.
Diameter driving wheels outside tires	68.8 in.
Boiler:	
Type	Conical
Steam pressure	324 lb.
Fuel	Soft coal

Diameter, second ring, inside.....	64 3/4 in.
Length inside tube sheets.....	17 ft. 2 in.
Grate area.....	7.7 sq. ft.
Heating surfaces:	
Firebox.....	140 sq. ft.
Tubes and flues.....	1,580 sq. ft.
Total evaporative.....	1,720 sq. ft.
Superheating.....	549 sq. ft.
Comb. evaporative and superheating.....	2,269 sq. ft.
Tender:	
Capacity, cooling water tank.....	5,290 gal.
Capacity, feedwater reservoir.....	1,138 gal.
Fuel capacity.....	6 tons
Condenser:	
Total surface.....	2,370 sq. ft.
Water cooling installation:	
Cooling surface.....	16,150 sq. ft.
Rate of cooling air circulation 1,100 r.p.m. of fans.....	1,765 cu. ft. per sec.
Rate of cooling water circulation.....	12,700 cu. ft. per hr.
Floor space of cooler.....	122.8 sq. ft.
General data estimated:	
Horsepower.....	2,500
Weight proportions:	
Total weight engine ÷ horsepower.....	91.5
Total weight engine ÷ comb. heat. surface.....	101
Boiler proportions:	
Firebox heat. surface ÷ grate area.....	3.72
Firebox heat. surface, per cent of evap. heat. surface.....	8.14
Superheat. surface, per cent of evap. heat. surface.....	31.9

Counsel for State Commissions Reviews Valuation Situation

WASHINGTON, D. C.

EUGENE W. REED, special valuation counsel of the National Association of Railway & Utilities Commissioners, has sent to the state commissions a bulletin reviewing the present railroad valuation situation in which he declares that "we are on the threshold of the most critical stage of valuation," because it is hoped that the Supreme Court may soon decide the principles involved. Mr. Reed says that if the court should hold that present-day prices shall control in finding value for rate-making purposes the aggregate valuation might be increased to \$35,000,000,000 and that under the theories of reproduction contended for by the railroads generally the valuation would aggregate more than \$40,000,000,000. The bulletin says in part:

The inquiry may be made as to what effect the decisions of the U. S. district courts in the San Pedro, Los Angeles & Salt Lake case and the Kansas City Southern Railway valuation case, as well as the decision of the United States Supreme Court in the Indianapolis Water case, may have on the orderly procedure of the valuation of railroads under the valuation act by the Interstate Commerce Commission. Up to the present date there has been no cessation of the work in any of its phases, nor has there been any change in the policy of the commission in so far as conclusions may be drawn from the publication of any of its official acts. Tentative valuations are being issued rapidly on the same basis as heretofore, and final valuations are being published which in no way deviate from those heretofore published. From this it would appear that the commission assumes that the United States Supreme Court will approve the work that has been done to carry out the requirements of the valuation act. Should the court conclude that the commission has failed to perform its full duties, or exceeded its authority under the act, obviously it will then be necessary for it to revise its work, in order to comply with the law.

Interpretation of the Law is Desired. It would be unfortunate if the court should dispose of the San Pedro case on jurisdictional questions, and thus leave the country in suspense on the general issues involved. What everybody wants is a clean cut decision disposing of the main points in controversy along broad and comprehensive lines. The work of valuing the railroads has now been in progress for twelve years, and the commission has expended more than \$29,000,000 in the enterprise. During that time the inventories have been completed and tentative valuations issued on most of the railroads. The commission has evolved certain principles, adopted certain standards, and reached certain conclusions which it deems fair and equitable and in substantial conformity with the law. Representatives of the railroads contend these conclusions are wrong. State commissions believe that some of the conclusions are wrong. The

United States Supreme Court is the tribunal to which all look for a settlement of the controversy. Until it acts (as aptly stated by the federal court in the Kansas City Southern Railway opinion handed down December 31, 1926) "there is an utter lack of certainty, stability or harmony in valuations. The carriers, the public, regulatory commissions and courts are without a definite standard." There should be a judicially approved standard for making these valuations. Such a thing is by no means beyond the possibility of accomplishment and the San Pedro, Los Angeles & Salt Lake case seems to offer the first opportunity for definite progress in this direction.

The Crucial Stage is Near. In the meantime we are on the threshold of the most critical stage of valuation. The principles involved are, we hope, soon to be decided. The general public and the regulatory commissions of every state are vitally interested in the outcome. If judicially approved standards for the valuation of railroads are established, they will be applicable, with such modification as each case may require, to the valuation of public service facilities over which state commissions have jurisdiction. The work, therefore, must proceed awaiting developments.

The Effect of "Spot Reproduction" on Valuations. The decision of the United States Supreme Court in the Indianapolis Water case (Benton's bulletin No. 88-1926) does not directly affect the valuation work now being done by the Interstate Commerce Commission under the provisions of Section 19a, but may affect the valuations when they are brought down to date for recapture of excess earnings, or other purposes for which they may be used under the transportation act. The valuations made are based on the cost of reproduction new less depreciation, except that the commission uses, for all accounts other than land, a uniform pricing date as of June 30, 1914. Land has always been appraised on its present value, as of the date of the inquiry. Additions have been made for working capital, and, without specification of amount, for intangibles. Having a complete inventory of the property, spot reproduction cost as of any date may be applied by the use of trend price factors compared with 1914 prices. Therefore, if the decision means that present day prices shall control in finding the value for rate making purposes, the commission has data necessary to conform with that requirement. It should be remembered, however, that if present day prices were to be applied to the inventories of all the railroads, and if 60 per cent were thereby added to their valuation, the aggregate value would be increased from \$22,300,000,000 (which may be taken as an approximate estimate of their value at 1914 prices, with allowance for the net cost of additions since that date) to more than \$35,000,000,000. This increase would result if the present cost of reproduction were to be estimated in accordance with the rules and principles employed by the Bureau of Valuation. Under the theories of reproduction contended for by the railroads, generally, the valuation of their properties would aggregate more than \$40,000,000,000.

Correct Principles must be Followed. These facts serve to emphasize a matter to which we have frequently directed attention in former bulletins, and to the support of which we have constantly directed our efforts, viz.: The importance of adhering to principles in estimating reproduction cost of constructing railroad property which do not exaggerate such cost beyond what would necessarily be expended to produce it in the manner it is produced in the actual and efficient construction of railroads. It is our belief that the higher estimates of reproduction made by the railroad engineers are largely the result of adhering to a theoretical program which develops many elements of cost not actually incurred in efficient railroad building, and many elements of cost which do not involve any capital investment. If rates must be paid on the present cost of producing the property, the rate base will be high enough if not inflated by fictitious elements of value. Some consolation may be found, however, in the fact that the trend of all commodity prices is again on the downward grade. Such prices reached the peak—231 per cent of pre-war prices—in 1920, dropped off to 150 per cent in 1921, and gradually rose again to 162 per cent in 1925. Data compiled by statistical bureaus indicate that in 1926 the trend dropped from 156 per cent during the first quarter to 146 per cent during the last week of the year.

A MISSOURI PACIFIC LOCOMOTIVE on January 8 established a record on the system when it pulled a train of 115 cars of coal and two empties from Bush, Ill., to Dupo, a distance of 102 miles, in nine hours. On the same day another locomotive hauled a train of 203 cars—201 empties and 2 loaded—weighing 7,180 tons, southbound over the same route. It is now planned to attempt to haul 300 empty cars with one locomotive from Dupo to Bush.



The Lehigh Valley Is Rapidly Building Up Its Passenger Business—The Black Diamond

Lehigh Valley Attracts Attention

Stock rose 19 points in week on rumors that rival carriers were buying to secure control

"AT the annual meeting of the stockholders of the Lehigh Valley Railroad Company held in Philadelphia today, Edward E. Loomis was re-elected president as was the present board of directors. No opposition appeared. The vote cast for the present management was 930,014, which is 80 per cent of the total stock. This vote was more than 120,000 greater than at the meeting a year ago and was the largest vote ever cast at an annual meeting in the history of the company."

The foregoing statement was issued following the annual meeting of the Lehigh Valley stockholders held at Philadelphia on January 18. Its interest was derived not from what it said but from the fact that there was nothing else to say. There had been rumors, however ill-founded, that some important news was to have broken, including, possibly, the election of new directors representing other railroad interests.

For some reason not yet clear the price of Lehigh Valley common stock had an advance of \$19 a share during the week ended January 15. The closing price for the week was 120 and one time during the week a high price of 121¼ was reached. Even subsequent to the annual meeting the rise in price continued and on Wednesday of the present week a new high price of 125 was reached. During the year, 1926, the price of this issue ranged between 75½ on March 3 and 106 reached on December 10. The par value of the stock is \$50 a share. The regular dividends on the issue have been \$3.50 per share or 7 per cent annually since July, 1919, and an extra dividend of 3 per cent was paid on January 3.

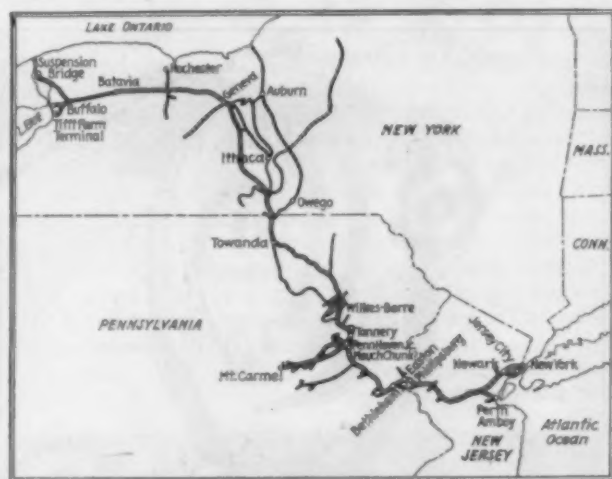
This increase of \$19 a share, which would be equiva-

lent to \$38 on a \$100 par value, in the space of a few days is the most spectacular increase in the price of a railroad stock in many years. As a result, those who follow the stock market were naturally led to seek causes and the general supposition was that there had been competitive purchase of the stock by interests connected with the New York Central as opposed to interests associated with L. F. Loree. It was pointed out that the New York Central wished to acquire a working control of the Lehigh Valley so as to secure a new line between the Niagara frontier and tidewater and to secure new terminal space—the Lehigh Valley being well supplied with such space at both the Buffalo and New York ends of its line. Mr. Loree, it was pointed out, needs a connection between the Delaware & Hudson, of which he is president, and of the Buffalo, Rochester & Pittsburgh which the former road has leased. It was remarked that Mr. Loree had finally decided that the purchase of control of the Lehigh Valley offered the best opportunity of procuring a line connecting the Delaware & Hudson and the Buffalo, Rochester & Pittsburgh, which lie some 150 miles apart. Some consideration was also given to Mr. Loree's proposal for a new line across Pennsylvania—the proposed New York, Pittsburgh & Chicago—which as planned is to extend from Pittsburgh, Pa., to Easton and which accordingly will need a connection with tidewater such as would be offered by that part of the Lehigh Valley main line between Easton, Pa., and Jersey City, N. J.

The ground for these surmises is not yet apparent. It is, however, another example of the speculative factor that will always exist in connection with railway consolidation and railway consolidation rumors. At least

the surmises are correct in so far as concerns true appreciation of the Lehigh Valley's actual merger possibilities.

The fact that nothing of moment developed at the annual meeting rather indicates that the ownership of Lehigh Valley stock was more stable than was estimated. This stock ownership is quite diversified and even George F. Baker, chairman of the First National Bank, who is generally understood to be the guiding hand behind Lehigh Valley policies, exercises such control as he has with ownership of but a small proportion of the total outstanding Lehigh Valley stock. It is said that large numbers of shares are held in the territory served by the Lehigh Valley in Pennsylvania and as a result of the policy of the management working to that end a large number of shares are held by Lehigh Valley employees. That the present stockholders have held onto their shares in spite of the attractive prices of the past week signifies stability of the stock ownership and the record



The Lehigh Valley

vote may quite properly be regarded also as an expression of confidence in the present management.

1926 a Record Year

The Lehigh Valley completed in 1926 the best year in its history. It earned the largest gross income, and the largest net railway operating income that it ever earned in any year. The net income after fixed charges was the greatest with the single exception of 1921 in which year large dividend disbursements were received from the coal subsidiaries. In 1921 more corporate income was received from that source than from railroad operations.

The complete record for the full year 1926 is not yet available. The latest actual figures available are those for eleven months of the year. They show that gross income for the first 11 months of 1926 totaled \$73,708,986 as compared with \$69,424,726 in the same period of 1925, an increase of 6.2 per cent. The gross earnings in

1925 were affected by four months of coal strike. A better comparison, therefore, might be with 1924 in which year the road earned the largest gross revenues for any year up to that time. Gross revenues for the first 11 months of 1924 totaled \$70,087,240 which total was exceeded in 1926 by \$3,600,000.

The operating ratio for the first 11 months of 1926 was 75.2. This continues the progressive betterment in the Lehigh Valley's operating ratio under way since 1920. The 1925 operating ratio was 77.16, that for 1924, 79.83. The 1926 figure was the best since 1916 in which year the percentage was 71.15.

The net railway operating income for the first 11 months of 1926 was \$13,023,150, which 11 months' total was larger than the total for any previous full year except in 1910 when net operating income was \$13,267,800. For instance, it compared with \$11,912,792 for the first 11 months of 1925, representing an increase of 9.4 per cent. The net operating income for the full 12 months of 1925 was \$12,494,980. In 1925 the railroad earned \$6.65 a share or 13.30 per cent on its common stock. The 1926 earnings will approximate \$8.10 a share or 16.20 per cent.

The only traffic figures at present available for 1926 are those for the first ten months of the year. They show that the net ton-miles were about 3½ per cent greater than in 1925 but about 9 per cent less than in 1920. The busiest year the road ever had was found to be 1918.

Increase of High Grade Traffic

About 40 per cent of the Lehigh Valley's total revenue tonnage is anthracite coal and the road is the largest carrier of the so-called domestic sizes. In addition, about 6 per cent of the total revenue tonnage is bituminous. The road in addition to reporting coal tons as required in the commodity classification also reports coal ton-miles. The coal ton-miles constitutes about 31 per cent of the total revenue ton-miles and yield about 32 per cent of the total operating revenues. It will be interesting to see how the 1926 figures will line up in this respect because the anthracite coal industry in 1926 had two months of strike and then a very prosperous remainder of the year. Over a long term the tendency has been for the anthracite to remain rather stationary in volume—except for decreases due to strikes, while the higher grades of freight, notably traffic reported under the designation "Other manufactures and miscellaneous," has increased very substantially. In 1925 this particular tonnage constituted 13.37 per cent of the road's total traffic and it was considerably over twice what it was in 1920.

Terminals

These details give a ready idea of the attractiveness of the Lehigh Valley as a merger possibility. The road is handicapped by having a somewhat longer route between Buffalo and New York than its chief competitors. This

TABLE I—LEHIGH VALLEY OPERATING RESULTS, SELECTED ITEMS, 1916 TO 1926

Year	Mileage	Revenue ton miles coal	Revenue ton miles merchandise	Revenue passenger miles	Revenue per ton mile-cents	Total operating revenues	Total operating expenses	Net operating revenues	Operating ratio	Net railway operating income	Net after charges
1916	1,444	2,643,811,000	3,481,757,000	243,030,000	.650	48,859,909	34,764,977	14,094,932	71.15	.....	7,827,771
1917	1,443	2,850,619,000	3,579,816,000	243,924,000	.670	53,358,446	41,826,166	11,532,280	78.39	.....	9,688,471
1918	1,441	2,886,241,000	4,032,809,000	270,388,000	.770	66,788,903	57,926,977	8,861,926	86.73	6,821,131	6,763,406
1919	1,448	2,527,604,000	3,252,879,000	262,693,000	.893	65,542,502	60,309,198	5,233,304	91.68	3,776,291	2,559,556
1920	1,448	2,638,248,000	3,689,266,000	278,186,000	.971	75,223,862	80,315,096	-5,091,235	106.77	-6,779,615	1,596,964
1921	1,449	2,345,211,000	2,768,080,000	235,536,000	1.220	74,997,799	67,238,068	7,759,731	89.65	5,582,216	10,050,798
1922	1,373	1,415,578,000	3,042,517,000	218,630,000	1.135	62,418,889	59,023,940	3,394,949	94.56	590,084	1,991,247
1923	1,374	2,482,542,000	3,233,942,000	232,364,000	1.104	75,935,154	66,754,214	9,180,939	87.91	6,573,120	8,586,618
1924	1,375	2,083,381,000	3,646,575,000	253,566,000	1.109	76,374,805	60,967,969	15,406,837	79.83	11,391,549	7,352,038
1925	1,370	1,587,914,000	3,830,053,000	273,153,000	1.121	74,430,573	57,433,390	16,997,183	77.16	12,494,980	8,046,564
1926											
11 mos.	1,363	.....	.....	.....	.....	73,708,986	55,430,139	18,278,847	75.2	13,023,150	.....

Note—Standard return for operations during federal control \$11,318,714.

disadvantage is compensated for by several outstanding advantages. These include about the highest standard of roadway construction on any railroad in the United States and a skill in operation that enables the Lehigh Valley to offer a freight service sufficiently speedy to attract an increasing proportion of the rapidly growing fast freight traffic moving in this highly competitive territory. Preeminently the road's leading attraction as a merger possibility is its terminals, including notably the Tifft Farm development at Buffalo, the large tidewater area known as the Claremont Terminal at New York Harbor and also the Fitzpatrick Farm at Newark, N. J. The development of these areas has only begun. They were acquired as a result of foresight that saw the necessity of protecting the carrier's terminal needs for the future and as a means of developing industrial areas that would supply the carrier with increased traffic.

The Lehigh Valley today is in the position of being able to handle considerably more traffic than it is at present moving without the necessity of its being required to spend large sums for capital improvement in addition to which it seems to have almost unlimited possibilities for future expansion. As a merger possibility it excels the Lackawanna, for example, for no other

TABLE II—COMPARISON OF SELECTED FREIGHT OPERATING STATISTICS

	First 10 months 1926	First 10 months 1920	Per cent of change	
			Inc.	Dec.
Mileage operated	1,345	1,436	...	6.4
Gross ton-miles (thousands).....	10,944,361	10,409,656	...	5.0
Net ton-miles (thousands).....	4,912,722	5,401,994	...	9.1
Freight train-miles (thousands)...	5,953	6,035	...	1.4
Freight locomotive-miles (thousands)	7,354	7,423	...	0.9
Freight car-miles (thousands).....	284,485	243,303	16.9	...
Freight train-hours.....	453,325	549,637	...	17.5
Tons of coal consumed by freight locos.	931,845	1,102,683	...	15.4
Car-miles per day.....	29.3	20.7	41.5	...
Net tons per loaded car.....	26.3	31.6	...	16.8
Per cent loaded to total car-miles.	65.6	70.2	...	4.6
Net ton-miles per car day.....	506	460	10.0	...
Freight cars per train.....	48.8	41.3	18.1	...
Gross tons per train.....	1,838	1,725	6.6	...
Net tons per train.....	825	895	...	7.8
Train speed, miles per train-hour.	13.1	11.0	19.1	...
Gross ton-miles per train-hour....	24,143	18,939	27.5	...
Net ton-miles per train-hour.....	10,837	9,828	10.2	...
Lb. coal per 1,000 gross ton-miles	150	...	...	...
Loco-miles per loco-day.....	49.9	43.1	15.7	...
Per cent freight locos, unserviceable	17.9	31.1	...	13.2
Per cent freight cars unserviceable	6.5	7.0	...	0.5

reason than that it would cost so much to acquire the Lackawanna and because the Lackawanna does not have the possibilities for terminal development. It is not surprising under the conditions that every now and then there should be a recurrence of rumors that rival interests are buying into Lehigh Valley and competing in attempts to secure control of it.

The usual statistics are given in Tables I and II—the figures in Table II—Comparison of Selected Freight Operating Statistics—being those for the ten months' periods, the latest at present available.

THE MUTUAL BENEFICIAL ASSOCIATION of Pennsylvania employees has closed its 13th successful year. Beginning with 1927, three additional forms of insurance are offered to members: "full life," "paid up at age of 65" and "endowment at age of 65." The limit of the total amount of insurance available for any member has been raised from \$2,000 to \$5,000. The association has sold to members (and other employees) over 27,000 shares of Pennsylvania Railroad stock. Co-operative purchasing operations of the association have done business during 1926 amounting to \$1,000,000. These operations include stores, restaurants, local buying committees, discount plans, tailoring arrangements and other things. The membership now totals 18,000 employees, associated in 71 lodges. The insurance fund has \$800,000 invested in high class securities.

Long-Range Flood-Lighting Projector

A NEW 24-in. diameter Golden Glow floodlighting projector has been placed on the market by the Electric Service Supplies Company, Philadelphia, Pa. This new projector is known as type FLA-2430, projects a long-range beam of high intensity and is designed to meet service conditions such as are imposed by the longer railway yards where space for tower location is available only at either end of the area to be floodlighted.

The projectors have a cast aluminum alloy case, approximately 3/16 in. thick, equipped with a hinged rear door made of the same material and in which a 24-in. diameter "Golden Glow" or crystal mirror glass reflector



The Golden Glow or Crystal Mirror Reflector is Mounted in a Non-Ventilated Cast Aluminum Alloy Case

is flexibly mounted. This construction provides easy access to the reflector for relamping or cleaning without disturbing the lamp or its focusing, or the directional training of the floodlight. The front of the light is regularly equipped with a molded convex lens made of special heat-resisting and annealed glass, approximately 1/4 in. thick. The lens is held in position by flexible retaining clamps, thus resulting in the practical elimination of breakage.

Focusing Device

The focusing device is the universal type permitting adjustment in both the vertical and horizontal planes. This device is mounted at the top for use with PS-52 floodlighting lamps or at the bottom for use with G-40 lamps, where a highly concentrated beam is desired. The entire case forms a weather-proof enclosure, and is of the non-ventilated type. The focusing device is fitted with a mogul socket. It is adapted for use with standard 1000 to 1500-watt, type "C," Mazda lamps with the PS-52 bulb for regular floodlighting or the 1000-watt type "C" Mazda lamps with the G-40 bulb for highly concentrated long-range work. The over-all height is 37 in.; over-all width 34 in.; weight 125 lb.

The entire unit is mounted on a swivel trunion allowing for directing the beam of light in any direction and with provision for locking firmly in position.

Report on Rockmart Collision

THE Interstate Commerce Commission has issued the report of W. P. Borland, director of the bureau of safety, dated January 11, on the collision of fast through passenger trains on the Southern Railway near Rockmart, Ga., on December 23, about 6:40 p.m. This collision was briefly reported in the *Railway Age* of January 1, page 165. Eleven passengers, seven employees and one news agent were killed and 113 passengers, four employees and six Pullman employees were injured.

Rockmart is on the line between Atlanta and Chattanooga, 50 miles north of Atlanta. The line, single track, "is operated by time-table, train orders and a manual block signal system." The only reference, however, in the report, to block signal operation is in connection with the southbound train, which train was not at fault. Northbound trains are superior by direction; but, to favor southbound trains on an ascending grade, it is common practice to require northbound trains to enter the siding when a southbound train is to be met, and the dispatcher's order required this in the case now reported. The collision occurred at a point about 4,000 ft. south of Rockmart station. Trains approaching this point from the south, pass over a curve of three degrees to the right and trains approaching from the north also approach over a curve of three degrees to the right, but there is 1,002 ft. of tangent between the two curves. The point of collision was on the northern-most curve.

A passing track on the east side of the main track was occupied by a freight train, the engineman of which had

No 101 one naught one Eng 1456 meet No 32 thirty two Eng 1326 at Shannon No 6 six Engs 1260 and 1205 coupled at Atlanta Jct
First No 2 two Eng 1219 at Rockmart and second No 2 two Eng 1265 at Braswell No 32 thirty two No 6 six and First and second No 2 two take siding.

The northbound train (ten cars) had received the order at Atlanta, written on Form 31. At McPherson, 11 miles south of Rockmart, where a stop was made, Road Foreman of Engines Pearce, who had been riding in the car next to the engine, on the way to his home at Rome, 22 miles north of Rockmart, boarded the locomotive and took charge of it; and Engineman Keith went back to ride in the car. The train then proceeded, and



Front Portion of Train 2 After Engine Had Been Pulled Away



Locomotive Wrecked in Rockmart Collision; Engine 1219, Train 2

been ordered to leave room at the south end for the northbound passenger train to enter. The northbound engineman had a view of the switch, at the south end of the siding, for 795 ft. It was dark and raining at the time of the collision.

Southbound passenger train No. 101 (nine cars) stopped at Rockmart to take water, and there received a card stating that the block (to the next station) would be clear on the arrival of northbound train No. 2, first section. After water was taken, the train moved southward slowly (some 3,000 ft.) and had stopped or nearly stopped 883 ft. north of the switch when it was struck by the northbound train, No. 2, first section. The meet order, sent to both trains, was worded as follows:

in less than 20 minutes, passed the south switch at Rockmart at 50 miles an hour, or faster, and collided with No. 101. Both locomotives were derailed but remained upright. The tender of the northbound engine was wrecked. The combination car next behind it was crushed for about 25 ft. The coach next behind this telescoped the dining car, the third car in the train; and in the dining car most of the fatalities occurred. In train 101, the first two cars were derailed and badly damaged.

The employees killed were the road foreman of engines, the fireman, the baggage master and four dining car employees, all on the northbound train.

Abstract of Testimony

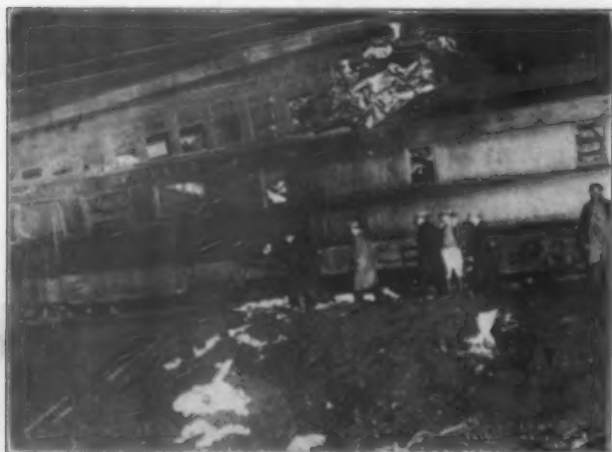
Various witnesses told of the whistling of the northbound train to notify the freight on the side track that signals were being carried for a second section, and of other whistling; so that there is no doubt that Pearce was in full possession of his faculties; yet he took no action to apply the brakes.

The conductor of the southbound train at once concluded on hearing the sound of the whistle and the roar of the train that No. 2 was coming too fast to be stopped at the switch; and he at once decided to get out of the car in which he was riding, but the collision occurred before he succeeded in doing so.

Baggagemaster Copeland, of train No. 101 assisted in removing Road Foreman of Engines Pearce from his engine and he said the road foreman asked him how the accident occurred; when told that he had failed to

take siding for train No. 101, he replied that Engineman Keith, Fireman Moss and every one concerned had told him that he was to hold the main track; and he then added that when he sounded the station whistle signal he asked Fireman Moss, "We hold the main track?" and he said the fireman replied in the affirmative. Baggage-master Copeland was unable to explain what the road foreman had in mind when he used the words "every one concerned."

Engineman Keith, after oiling his engine, found Pearce in the cab, who told him that he was going to run the engine as far as Rome. Keith distinctly told him what the orders were and that they were to head in at Rockmart and meet train 101; and Pearce repeated these



The Telescoped Dining Car

instructions aloud. Conductor Arwood, a few seconds afterwards, asked Keith if he had told Pearce about the orders and was informed that he had done so.

Keith, when he saw that the train was passing the switch, started to apply brakes by the conductor's valve, but not soon enough to accomplish anything. Keith, when informed that Pearce, before his death, had stated that he was told to hold the main track at Rockmart, "did not feel that the road foreman would have made such a statement under ordinary circumstances," and was positive that Pearce understood the situation thoroughly when relieving him at McPherson. Keith did not deliver his written orders to Pearce, as is required when engine-men exchange, excusing himself on the ground that Pearce was an official, superior to him.

Conductor Arwood, of No. 2, had delegated to the baggage-master the duty of signalling to the engineman on approaching a meeting point, and claimed that when the conductor was engaged in taking up tickets, this practice was proper; the practice was followed to some extent. He did not know, until after the train had started from McPherson that Pearce was going to relieve the engineman.

Engineman Turner of the freight standing on the side track, did not answer the whistle signal given by No. 2, but instead sounded on his own whistle the stop signal, realizing that a collision was imminent.

Statements were obtained from doctors and nurses at the hospital in Rome where Pearce was taken and where he remained until his death on the following day, but no useful information was gained.

The dining car, which was crushed, was built by the Pullman Company in 1917. An examination of the plans of the end construction and also of the two cars ahead of it in the train, failed to disclose any reason why this par-

ticular car should have been telescoped. (All cars in both trains were of steel).

Signal Supervisor Hinds said that but for unavoidable delays, the automatic signals and automatic train control apparatus under construction would have been placed in service at Rockmart prior to December 23.

Conclusions (Abridged)

"This accident was caused either by the failure of Road Foreman of Engines Pearce and Engineman Keith, of train first No. 2, to have a thorough understanding as to the contents of train order No. 92, which required their train to take siding at Rockmart for train No. 101, or by the failure of Road Foreman of Engines Pearce to remember the contents of the order."

Under ordinary circumstances No. 101 would have been required to take the siding. Engineman Keith said that he was very careful to inform Pearce about taking the siding but the high speed at which the train was running makes it clearly apparent that Pearce had no intention of stopping. Pearce is said to have stated while being removed from the wreck that he had been told he was to hold the main track, but no formal statement was obtained from him. However, whether he misunderstood the requirements of the order or had forgotten it, the fact remains that he was at fault, for he had exercised his authority as the superior officer of Engineman Keith by relieving the latter of the operation of the engine, and it was incumbent on him to know absolutely what orders were outstanding affecting the movement of the train.

Engineman Keith's excuse that orders need not be given to a superior, is not well founded; if any official relieves the regular engineman, he then automatically becomes the engineman and is bound by all the rules. In allowing Keith to leave the engine, Pearce violated instructions which had been issued April 19, 1926.

Engineman Keith said he had shown his orders to Fireman Moss before starting from Atlanta and Moss, an experienced employee who had passed examination for promotion to engineman, should have directed the road foreman's attention to the orders when it was apparent that he was not going to stop at the switch. [Moss was killed].

Conductor Arwood, not knowing the location of the train with exactness, was not in position to apply the brakes when the engineman's neglect became apparent. "When the situation on any particular train reaches a point which makes the conductor little more than a ticket collector, then it would appear that some provision should be made to correct the situation by the use of ticket collectors or train auditors rather than by having the conductor depend on the baggage-master, the flagman or the train porter. Had Arwood made it his business to keep track of the exact location of the train, he might have averted the collision."

Statements of various employees indicated that they had not been examined on the rules since August, 1923, and both Arwood and Keith had incorrect understanding of rules; steps should be taken at once to see that all persons, whose duties are affected by the rules, shall be examined sufficiently often * * *

If road foremen or any other officials are to be allowed to relieve an engineman at will, such official should be examined and qualified in every respect as an engineman would be.

The report then refers to the company's action in installing automatic signals and in introducing automatic train control when not required to do so by the commission. At the time of the collision, it appears according

to the records, that all that remained to be done, was the work of painting and testing.

Pearce was 47 years of age and was employed by the Southern as an experienced engineman in 1912. He had been road foreman ten years and on this division five years.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading for the week ended January 8 amounted to 940,800 cars, starting the year with an increase of 33,178 cars as compared with the corresponding week of 1926 and an increase of 6,630 cars as compared with 1925. All districts except the Northwestern showed increases as compared with the corresponding week of last year and all except the Northwestern and the Central Western showed increases as compared with 1925. Loading of grain and grain products, livestock, coke and ore was less than that for last year, but coal loading, 214,176 cars, showed an increase of 20,863 cars and miscellaneous freight showed an increase of 17,187 cars. As compared with the corresponding week of 1925, however, all classes of commodities showed reductions except merchandise and miscellaneous. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

REVENUE FREIGHT CAR LOADING—WEEK ENDED SATURDAY, JANUARY 8, 1927

Districts	1927	1926	1925
Eastern	217,362	203,790	212,531
Allegheny	184,320	181,257	183,553
Pecahontas	58,515	56,471	50,022
Southern	150,023	139,497	147,223
Northwestern	110,750	115,077	118,651
Central Western	140,486	137,429	152,720
Southwestern	79,344	74,101	69,470
Total Western districts	330,580	326,607	340,841
Total all roads	940,800	907,622	934,170
Commodities			
Grain and grain products	45,554	48,089	50,950
Live stock	34,391	37,279	39,909
Coal	214,176	193,313	217,631
Coke	11,571	17,611	13,614
Forest products	61,994	59,332	69,285
Ore	9,688	10,619	10,616
Misc. L.C.L.	244,481	239,621	232,851
Miscellaneous	318,945	301,758	299,314
January 8	940,800	907,622	934,170
January 1	740,348	741,560	767,098
December 25	772,590	772,590	701,061
December 18	950,573	950,573	969,738
December 11	998,715	998,715	1,008,696
Cumulative total, 2 weeks	1,681,148	1,649,182	1,701,268

The freight car surplus for the first week of January averaged 326,837 cars, including 183,462 box cars, 93,765 coal cars, 26,133 stock cars and 10,905 refrigerator cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the first week of 1927 showed an increase over the previous week of 8,869 cars. Compared with the same week last year the total loadings were heavier by 2,956 cars.

	Total for Canada		
	Jan. 8, 1927	Jan. 1, 1926	Jan. 9, 1926
Grain and grain products	12,386	10,135	10,842
Live stock	2,362	1,333	2,479
Coal	6,882	5,854	6,160
Coke	396	421	514
Lumber	2,208	1,957	2,270
Pulpwood	3,219	2,441	3,001
Pulp and paper	2,028	1,482	2,570
Other forest products	2,225	1,976	2,445
Ore	1,340	1,364	1,326
Merchandise, L.C.L.	14,727	12,422	13,644
Miscellaneous	9,690	9,209	9,256
Total cars loaded	57,463	48,594	54,507
Total cars received from connections	30,654	31,073	29,545

Burlington Train

Control Approved

WASHINGTON, D. C.

DIVISION 1 of the Interstate Commerce Commission has issued a report approving, with one exception, the installation of the automatic train-stop system of the Sprague Safety Control & Signal Corporation on the Omaha division of the Chicago, Burlington & Quincy, under the commission's second order. This installation extends from Pacific Junction, Ia., to Missouri Pacific crossing at Lincoln, Neb., 81.58 miles, of which a length of 25.81 miles is double track. The installation is a continuation of that made under the first order between Creston and Pacific Junction, Ia. There are 44 locomotives equipped with the train-stop apparatus.

The cost of this installation to date was reported by the company as follows:

(1) Roadway Equipment:	
Total cost of roadway equipment of train control installation, less power lines and power apparatus, if any, and less cost of signals or cost of change in existing signal system; less salvage	\$40,690
Total cost of power lines and power apparatus, if any, less salvage	44,478
Total cost of signal system installed in connection with train control; less salvage	None
Total cost of changes in existing signal system made necessary by train control; less salvage	34,740
Total costs all other roadway equipment, if any	1,500
Total cost of roadway installation	121,308
(2) Locomotive Equipment:	
Total cost locomotive equipment installed	44,000
Total cost of installation	\$165,308

The exception noted and the requirements as to inspection, tests, maintenance, signals, etc., are as follows:

Since overcharging of the capacity reservoir may interfere with or prevent an automatic service reduction in the equalizing reservoir and brake pipe, adequate means must be provided and maintained on all locomotives to prevent such overcharging.

1. Conditions observed at the time of the inspection indicated that a higher degree of maintenance will be necessary if satisfactory performance is to be expected.

2. Care must be exercised to maintain the circuits of the headlight generator and lights and the train control system free from grounds, as otherwise a combination of double grounds of low resistance might prevent the vent valve from operating and cause a false clear or non-operating condition.

3. In this installation the automatic exhaust from the equalizing reservoir is made through a service application valve in the brake valve head. The proper operation of this valve depends upon the integrity of the connecting pipe between the oil reservoir and this head, and of the movable parts in the latter. The Sprague Company has an alternative, interchangeable construction in which the automatic exhaust from the equalizing reservoir is made at the pilot or vent valve, and this alternative feature is brought to the attention of the carrier for consideration.

4. The importance of checking operation whenever changes are made or new equipment installed either on locomotives or the roadside cannot be over-emphasized.

5. All track magnets should be tested and the instructions of the manufacturer carefully followed as to procedure of installation. Magnets should be regularly inspected and tested to insure that they are in operative condition, and after each renewal of battery, wire, or magnets, should be inspected to insure that proper connections of the neutralizing circuits have been made; report being made on a form provided for that purpose and forwarded by the inspector to a designated officer.

6. It is suggested that braking distances approaching Pacific Junction from the west, approaching the end of double track at Gibson, and approaching Omaha passenger station; and the braking distance for westbound trains approaching double track at Gibson be given careful consideration with a view to determining whether increased protection is practicable or desirable at those points.

Odds and Ends of Railroading

A Harrisburg (Pa.) Nursery Rhyme

Cheer up, railroad petition,
Don't feel blue;
You may be a bus line
In a year or two.

Tichio, Peru, has the distinction of being the highest railway station in the world. It is 15,610 feet above sea level and the entire climb is made in 106 miles. In this distance the trains pass over 67 bridges and 16 switchbacks and go through 65 tunnels.

According to press reports, through service was established January 17 on the Russian railways between Riga on the Baltic Sea and Vladivostok on the Pacific Ocean. Two trains will make the trip each way per week taking 13 days, making it by far the longest through run in the world. No through trains have been operated for over ten years. Formerly, under the Czarist regime, the service rendered on this journey across two continents was heralded as excellent. American newspaper correspondents who have since made the trip on the local trains describe the service as execrable.

In the *Railway Age* of January 8, reference was made in the "Books and Articles" list of a dynamometer built by George Stephenson and Nicholas Wood in 1918 (instead, of course, 1818), and William Elmer, special engineer of the Pennsylvania, writes:

I have often wondered what people did in Heaven and it is very gratifying to know, from such an authoritative source as the *Railway Age*, that George Stephenson and Nicholas Wood are having lots of fun building dynamometer cars.

Now, now, how ever did such a slip as that occur? But after all it might have been worse: the date contained four figures and only one of them was wrong. That makes an average of 75 per cent correct, which, as ex-schoolboys, we all know, is passing.

Laying out a few statistics end to end, Charles Frederick Carter says: "If those fifty-two million cars (loaded each year in this country) could all be loaded at one time and coupled into one continuous train they would reach from the earth to the moon, encircle that luminary at its equator twenty-nine times and leave a loose end several thousand miles long dangling in space, liable at any moment to become tangled up in the tail of a wandering comet and, perhaps, jerk the moon out of plumb. Fortunately, railroad communication with the moon has not yet been established."

An advertising expert has estimated that the city of Milwaukee has received more than a million dollars worth of free national advertising because the Chicago, Milwaukee & St. Paul is familiarly known as the "Milwaukee." Now it remains for some equally well informed advertising man to say how much publicity New Haven has received from the New York, New Haven & Hartford; Rock Island from the Chicago, Rock Island & Pacific; Alton from the Chicago & Alton; Reading from the Reading Company; Burlington from the Chicago, Burlington & Quincy; Atchison and Topeka from the Atchison, Topeka & Santa Fe; San Francisco from the St. Louis-San Francisco—which does not run within many hundreds of miles of it—and, above all, Chicago, from about thirty roads, large and small, whose names begin with its name.

Frank M. Worthington, superintendent of the Coast division of the Southern Pacific Co., recently retired after 44 years and 5 months active service. At a banquet given in his honor, W. M. Jackle, assistant engineer maintenance of way, told of an incident wherein Mr. Worthington refused to pass on responsibility. A board of inquiry developed that a derailment had been caused by excessive elevation on a sharp curve, brought

about by gradual settlement of a deep fill. The findings were sent to the general office and the assistant general manager promptly wired back for the name of the individual responsible. Instead of naming the section foreman or roadmaster or Mr. Jackle, who was then division engineer, Mr. Worthington wired his own name as the individual responsible. "You and the roadmaster, as well as myself, have passed this place many times," he told Mr. Jackle, "and I, as ranking officer, accept the responsibility."

Evidence of a "heads I win, tails you lose" policy in dealing with reckless passengers, which doubtless contributes to the British railways' showing of travel safety—

(From the Times, London)

In a summons at the Greenwich Police Court yesterday against Ralph Atkinson, of Crayford, for leaving a carriage of an electric train in motion at St. John's station, counsel for the Southern Railway said that after the train was on the move, a door opened and a porter pushed it to, but it was again opened, and the defendant jumped out. The Westinghouse brake was applied, but the train could not be pulled up until the carriage door was smashed against a railway bridge. The defendant said that in the train he met a school friend, whom he had not seen for 30 years, and only realized that he had reached his destination when the train was starting out of the station. He was ordered to pay a fine of 10s. and £2 2s. costs.

Though Texas lost its woman governor January 18, when "Ma" Ferguson relinquished office, it still has a woman railroad president. Mrs. Sarah Edenborn of Shreveport, La., has just been re-elected president of the Texas lines of the Louisiana Railway & Navigation Co., consisting of about 200 miles of line from McKinney, Texas, through Greenville, to Shreveport.

An interesting interlude in the railway ticket clerk's life is the blushing young lady who comes in to make reservations and is at a loss as to whether to give her maiden name, which she bears at the moment, or to give her married name, which she will bear when she goes on her honeymoon trip. According to the Association of Railway Ticket Agents, it is quite a common practice for the ticket agent to arrange all of the details in connection with the honeymoon trip and he serves as Cupid very frequently in his official capacity. Members of the Lucy Stone League, women who believe in keeping their maiden name and also give their name with initials only under every possible contingency, meet with little encouragement from the steamship ticket agent. In a recent case a woman called up the ticket office and made the reservation in her name but giving initials only and upon boarding the boat discovered that she was quartered in the same stateroom with three men. It is reported she has resigned from the Lucy Stone League.

Oh Strangest Lie!

There was a man who understood
A plain railroad timetable;
He wasn't bad, nor even good,
He wasn't rich, nor able
To paint a picture, write a book,
Nor could he make a table.

No genius he, in fact quite dumb
In ways all men respect. It's true
That, though his skull was thick and numb,
His folded books of time he knew.
And could we doubt there was this man?
Ah, I would doubt and so would you!

MALLET.

Communications and Books

Adherence to Specifications

SACRAMENTO, Calif.

TO THE EDITOR:

I have read the letter in the *Railway Age* of December 18, 1926, on my recent paper, "Purchasing Material on Specification," wherein the writer of the letter dwells largely on my statement, "Railroads should not, however, be in too great a hurry to eliminate an old specification before drawing up a new one," and explains that this means a slowing up of progress. The writer, however, seems to have overlooked the statement, "It is our policy to be interested in new products."

I cannot see wherein we have stopped any research work or experimentation by purchasing to specification. On the other hand, it appears to me that this would be an incentive to developers of new products to finish their research, improve their product and show wherein the present product was not giving the desired results.

From time to time, we encounter firms who desire to sell their product on "merit" only, but as time progresses we find out that this policy is going into the discard, as it is becoming more and more appreciated that the purchaser has just as much right to demand a standard for the finished product as the manufacturer has to demand that the raw materials he purchases meet certain definite requirements.

GEORGE L. BAXTER.

Liquor an Aid in Selling Railway Supplies?

MID-WEST.

TO THE EDITOR:

The letter to the editor entitled "Liquor and Salesmanship," published in the *Railway Age* of December 4, page 1096, expresses my thought so closely that I cannot refrain from discussing it. The use of liquor in our line has in some cases developed to the extent that instead of having service men, who perform the real duties of watching the efficiency of their product, they are service men rather in the sense of serving and dispensing liquid refreshments.

The general continuation of such a practice is bound to result harmfully, not only to the supplymen but also to the railroad employee who is so unfortunate as to be the recipient of such influence, which can only tend to reduce efficiency, and in cases where strength of character is somewhat lacking the result is utter demoralization. Railroad service today demands full efficiency from all employees and the supplymen should use their influence to assist in building up this efficiency rather than attempting to tear it down for their own selfish and individual advancement.

As to the matter of traffic, where consideration on this account is deservedly given and without unfair discrimination, I have little to say. However, whenever a supply company uses as a wedge traffic that really is not controlled by it, and that as a matter of fact does not originate in its own operation, but results in the operations of another company which may be interested in some slight financial way, and that even though originating is not controlled by the company in question, then it seems to me that something should be done.

I have in mind a company under the condition just mentioned that has been waving the inducement of the movement of a large number of cars through a certain district, where an analysis of this movement developed the fact that fully one-third of the traffic moves over roads which do not and cannot give this company any business, and most of the balance moves over roads which give the company very little business. Although one road gives this company practically all of its business in that line, it receives less than three per cent of the entire volume of traffic. In view of the above, I think one will agree that either this company is unfair to the roads which are favoring them or else they

have absolutely no control over the traffic in question, and on this account are unfair in their methods of trying to influence business with the traffic in question.

PRESIDENT, Railway Supply Company.

Railway Taxation in France

TO THE EDITOR:

I have read with great interest the study which appeared in the *Railway Age* of November 13, under the title "Railway Tax Increase Making New Record," regarding the increase in taxes paid in the United States by Class I railroads. Will you permit me to submit to you a few figures on this subject which will perhaps clarify on a more recent basis the comparison which the writer makes between the United States and other countries of the globe?

The writer of this article expresses the opinion in effect that the United States is the country where the railways hand over to the public treasury the largest proportion of their receipts, and he cites notably the case of Great Britain, which, according to general belief, "groans under the burden of taxation," and where various taxes paid by the railways in 1925 amounted to only 3.5 per cent of their gross receipts, while this percentage for the United States went to 5.9 in 1925 and will reach 6.1 in 1926. However, in France the taxes paid by all the five large companies went to 9 per cent of the gross receipts in 1913 and have amounted to 10 per cent each year from 1921 to 1925, inclusive.

If one compares the taxes, as does the writer of your article, to the dividends paid to stockholders, one obtains for France (all companies) and for the United States (Class I roads) the following figures:

	France	United States
1913	Dividends 146 million francs	376 million dollars
	Taxes 165 million francs	136 million dollars
1925	Dividends (including operating bonus) 156 million francs	344 million dollars
	Taxes 886 million francs	358 million dollars

One sees from this that the ratio of taxes to dividends reached in 1913 in France 1.13 (as against 0.36 in the United States), and, in 1925, 5.68 in France (as against 1.04 in the United States).

For 1926 the taxes will mount still higher in France, inasmuch as the law of August 3, 1926, raised the transport taxes in a manner to obtain 1,500 million francs additional each year. It seems to me that these figures can scarcely fail to interest the readers of the *Railway Age*.

M. PÉSCHAUD,

General Secretary, Directing Committee,
Great French Railway Systems.

Headlights and Train Control

NEW YORK, N. Y.

TO THE EDITOR:

In your November 13, 1926, issue, an editorial appeared under the caption, "Headlights and Train Control," from which the following is an extract: "In all cases it has been necessary to raise the standard of headlight maintenance to insure protection to the train control equipment. This condition does two things: it causes headlight costs to mount and raises the question of which costs to apply to the headlight and which to the train control apparatus."

This naturally brings up the question, Is efficient maintenance of locomotive equipment economical? In answer, I think we have the locomotive cost and performance of today as recorded by the individual railroads and by the Chief Inspector of Locomotives of the Interstate Commerce Commission to confirm that it is.

There is no question but that the use of automatic train control, where power for such a system is supplied direct by the turbo-generator, necessitates first-class condition and closer ad-

justment of the electric headlight turbo-generator and wiring apparatus. This applies particularly to a better speed control of the generator, which is economical from both a maintenance and an operating standpoint, as otherwise it shortens the lives of the electric bulbs. It also necessitates a first-class condition of the wiring and the elimination of short circuits, and this should be economical as well for the lighting equipment alone. In other words, the elimination of both these deficiencies will bring about improved maintenance and, therefore, result in more economical upkeep and operation.

From personal examination, I find that the newer 750- to 800-watt headlight sets are better designed equipment than the 500-watt machines, and from comparative operating tests that we have conducted, the water rate or steam consumption is about 8 per cent less for the larger capacity under the same load conditions. Furthermore, on Mallet and other large locomotives, the locomotive demand, regardless of the train control requirements, is now almost up to the 500-watt capacity, whereas the train control equipment requires a maximum of about 200 watts.

In view of your editorial, it is pertinent to recall the early days of the electric traction track circuit where impedance bonds were used. The railroads at first maintained that faulty rail bonding caused train detentions by putting the signals to stop. This was exactly so and the railroads were required to maintain their bonding as it should have been maintained, with the result that better operation was brought about in view of the reduced rail resistance to the traction current. This is brought out in the article on this same subject, signed "Signal Engineer," in the *Railway Age* issue of December 4, 1926, page 1096.

Another case was in connection with power interlocking. In the old days the cases were not locked and the operators, in moving the levers back and forth if they did not function correctly, would manually release the locking and permit the completion of the lever movement without regard to what the switch or signal may have done. For example, in moving a switch lever, the movement of such lever is not supposed to be completed until a return indication has come from the switch to prove that it is over and fully locked, after which the lever stroke is completed, thereby releasing other dependent levers. The reason for failure, as I recall, was lack of maintenance, and it was arranged to lock all cabinets. The immediate complaint on the part of the operators was that there would be train detentions because of failure on the part of the apparatus. The result has been that no railroad would today think of leaving an interlocking machine unlocked, and the maintenance is carried on in such a manner that failures are few and far between.

This situation with respect to power interlocking will apply as well to the headlight generator, and it is my opinion, from investigations and observations, that if the larger units and the wiring are properly maintained, existing failures will be reduced, if not entirely eliminated, and maintenance and operating costs will likewise be reduced, regardless of the train control requirements. Therefore, on this basis of reasoning, the train control requirement for electric current should tend to improve rather than to be a detriment in the maintenance of the headlight and wiring equipment.

JOHN E. MUHLFELD,
Consulting Engineer.

Depreciation and Lessening of Value

CHICAGO.

TO THE EDITOR:

The editorial "Depreciation and Lessening of Value," which appeared in the January 8 issue of the *Railway Age* points out the one phase of the subject which, perhaps more than anything else, has caused great confusion in the matter of depreciation. I quote from it—"The distinction must be kept clear: accounting depreciation and actual lessening of value are not the same thing."

In endeavoring to keep that distinction clear in my own mind the thought comes to me of a small railroad 12 miles in length which has more than nine-tenths of its capital invested in a large bridge across the Ohio river. The relation between the physical condition of this carrier and its recorded depreciation accounts gives an interesting significance to the above quoted sentence. Since the large bridge cannot be replaced part by part

like ties or rail in a track, there must be a current provision to build up a fund which should equal nine-tenths of the total investment of the carrier by the time the bridge is ripe for renewal.

It can readily be seen then, that the carrier could make its piece-meal renewals of parts other than the bridge even before they mature and maintain structural excellence to the point of economic waste and yet it would be required to accumulate its retirement reserve fund for the future renewal of the bridge. Under those conditions is it correct to say that the retirement fund is depreciation in the sense of actual lessening of value? This carrier is, of course, an exaggerated example and the other extreme would be a railroad which consisted of only land, grading and track, in which case no retirement reserve need ever be accumulated and yet depreciation might exist to an alarming degree. Every railroad, by virtue of the nature and extent of its separate units, has its place somewhere between these two limits and it only remains to use careful judgment and the correct computations to ascertain in terms of dollars the distinction between accounting depreciation and actual lessening of value.

R. C. KRAMER,

Valuation Accountant, Chicago, Milwaukee & St. Paul.

Lettuce, Cantaloupes and Safety

WASHINGTON, D. C.

TO THE EDITOR:

The promotion of safety at highway crossings is a problem which the railroad officers of the country seem to treat with a notable lack of energy, if one may judge by the slow progress that is made. The slaughter continues with little apparent abatement. Canada has just reported 127 persons killed at crossings in 1926, and the United States will soon report more than ten times that number, without doubt. The larger roads are now setting up automatic flashing light signals much faster than heretofore, and for that much let us be thankful; but even those roads which pursue the most enterprising policy in this respect have innumerable crossings which continue to receive no attention. In the country as a whole, these crossings are numbered by the tens of thousands. There remains the great need of warnings at obscure crossings, and at little used crossings; also, the need of saving the lives of those reckless persons—the tribe will never be exterminated—who do not heed a red light or a bell.

The only general movement looking to the solution of this phase of the problem is that for the passage of laws requiring automobiles to be stopped at the approach to a railroad. Laws of this kind are already found on the books of a few states, and they tend in the right direction; but they are of questionable value. It has been reported in one state that the stop law is really observed by a percentage of drivers; those who have some understanding of the situation; but after all, systematic enforcement is utterly out of the question; and, at best, these statutes will always have to allow the driver some discretion. This leaves those drivers who are thoughtless, or will not exercise discretion, free to continue to swell the fatality records.

The desideratum is a law so phrased as to call for stopping when stopping is necessary and for only a slackening of speed when no train is approaching. The best form in which to frame such a law is to use tangible things, instead of mere words; to require towns or counties to erect a barrier in the highway. This is simple. It has been tried. Why is it not more generally tried? Posts set up in the center of the street with diverging paths for automobiles to go around the post, as used in Delaware and in Florida, are well spoken of.

The *Railway Age*, not long ago, told of a crossing in California which, without any person intending to influence drivers, discouraged high speed and thereby tended powerfully to promote safety; the roadway was left so rough (on and between the railroad tracks) that automobilists voluntarily reduced their speed. Why not something of this kind everywhere?

A depression, like a shallow ditch, extending completely across the highway from one side to the other, is an effective safeguard. In Arizona, the state corporation commission ordered such an arrangement at Avenue J, Phoenix, where the highway crosses the Atchison, Topeka & Santa Fe track. The commission called it a "speed trap." The requirement was that there should be a

depression in the concrete surface of the roadway, extending completely across, to be concave in shape, two feet wide and six inches deep. The order called for protection at night by the use of a reflex signal.

But this order, like so many other incidents in this irregular and sluggish campaign, turned out to be not much more than an illustration of the difficulty of making definite progress. Protests were received from proprietors of trucks carrying heavy loads of lettuce and cantaloups, who averred that they could not put up with such a hindrance to speed. And the commission suspended its order. This argument of the truck drivers would seem to be an extremely flimsy one. Surely a detour for the cantaloup wagons must have been easily practicable.

What the public needs in this matter is a lot more of commissioners and town and city administrative officers who will take active steps to put into actual use such safeguards as are available. Where there is decided difference of opinion in official bodies, it is desirable that somebody have the courage to go ahead with experimental improvements if nothing better can be secured. It is to be expected that railroads will be slow in making changes which ought to be initiated and paid for by the towns. Railroad officers can, however, do much "missionary work" by stirring up citizens, locally. No one can deny that the public interest and public safety are suffering from official inaction, which, all over the country, leaves apparently unnoticed thousands of dangerous crossings which might easily be made safer. The legislatures ought to be appealed to, if there is no other recourse.

J. C. S.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Guide to Original Sources for the Major Statistical Activities of the United States Government. Gives the names of the government departments collecting data and disseminating information under each subject covered by the statistical activities of the government, together with the correct name and address of each department or bureau mentioned. 18 p. Pub. by Govt. Print. Off., Washington, D. C. 5 cents.

Old Towpaths, by Alvin F. Dodd. The history of the canal era of our transportation bringing out the connection of their building with social, economic, and political conditions of the time. Unusually interesting, and well illustrated. 403 p. Pub. by D. Appleton & Co., New York City. \$5.

South African Railways and Harbours Magazine, Christmas, 1926. Suggested to those interested in the relations of railway expansion to economic development, to the literature of which the articles and illustrations in this number form a valuable contribution, and to those who, wanting to travel from the Cape to Cairo at present, would like to know what routes to take, and what to wear on the trains, the trails, and the roads. p. 1841-2220. Pub. by South African Railway and Harbours Magazine, Johannesburg, South Africa. 2 shillings sixpence.

Periodical Articles

The Beaumont-Port Arthur Territory and Its Development, by Kenneth E. Sutton. "First came the railroads and the saw-mills..." *Stone & Webster Journal*, January 1927, p. 47-52.

Petroleum Transport in the Tropics. The co-ordinated system developed to make a Colombian oil-field accessible, and which includes a railroad, a 400-mile pipe-line, a river fleet, and a highway fleet. Illustrated. *Bulletin of the Pan American Union*, December, 1926, p. 1181-1187.

Railways and Revolutions in Mexico, by Alexander V. Dye. *Map*, p. 322. *Foreign Affairs*, January, 1927, p. 321-323.

What Kind of Boston Is St. Louis?, by French Strother. "... St. Louis is the terminus of more important railroads than any other city." p. 256. *World's Work*, January, 1927, p. 253-268.

What the Railroads Face in 1927, by Samuel O. Dunn. "... it seems reasonable to conclude that the railways as a whole will do at least as well in 1927 as they have in 1926." *World's Work*, January, 1927, p. 237-239.

Looking Backward

Fifty Years Ago

George Westinghouse, Jr., telegraphed to his company that the North British Railway Company had adopted his air brake for all passenger cars and ordered 200 sets immediately.—*Chicago Railway Review*, January 20, 1877.

The passenger cars of the Philadelphia & Reading are supplied with heaters under the cars instead of having stoves inside. The heating apparatus is so constructed that in case of accident to the cars the furnaces will disconnect themselves from the cars.—*Chicago Railway Review*, January 20, 1877.

Several of the states that have not yet indulged in the luxury of a "Board of Railroad Commissioners" are now taking steps to supply the lack, and legislatures generally are being showered with bills requiring all sorts of "reforms" and "improvements" in railway management. Politicians should remember that it is hardly possible for them to suggest an improvement in the equipment or conduct of railways that has not already been the subject of earnest study by railway managers.—*Railway Age*, January 25, 1877.

Twenty-Five Years Ago

It is announced that through trains are to be run between Cleveland and Kansas City over the Lake Shore & Michigan Southern, the Lake Erie & Western and the Chicago & Alton, by way of Bloomington.—*Railroad Gazette*, January 24, 1902.

When the directors of the Atchison, Topeka & Santa Fe put the \$114,000,000 of preferred stock on the 5 per cent dividend basis much uneasiness was expressed lest that rate could not be maintained. Since then 4 per cent payments on the \$102,000,000 of common have begun.—*Railway Age*, January 24, 1902.

The State of Michigan has repealed the special charter of the Michigan Central, and the re-organization of that company under the general railroad law of the state closes an interesting chapter in the railroad history of that state. The charter provided that freight and passenger rates should be fixed by the directors of the company and it also fixed the amount of its taxes at a rate much lower than is now paid by other companies under the general law. The next question to be settled will be to determine the amount of damages that the company will be entitled to on account of such repeal.—*Railroad Gazette*, January 24, 1902.

Ten Years Ago

The state railroad commission of Wisconsin handed down a decision which orders radical reductions in freight rates within the state. The commission orders that the present maximum distance tariff for Wisconsin be superseded by a new distance clause rate tariff, carrying with it reductions of from 5 to 30 per cent depending on the classes.—*Railway Review*, January 20, 1917.

At a hearing before the House Committee on Interstate and Foreign Commerce on labor legislation proposed by the President, Chairman Adamson announced that the committee would give no further consideration to that section of the bill limiting the working hours of train employees to eight except as permitted by the Interstate Commerce Commission.—*Railway Age Gazette*, January 26, 1917.

Following a conference of Chicago railway executives on January 18 for the purpose of considering means of expediting the movement of coal cars within the Chicago switching district, an order was entered requiring that the railroads treat coal as a preferred class of freight with priority of movement over all other traffic except food, live-stock and perishables.—*Railway Age Gazette*, January 26, 1917.

NEWS of the WEEK



THE CHICAGO & ALTON has granted an increase of $1\frac{1}{2}$ cents an hour to first-class mechanics.

HOWELL ELLIS, secretary of the Public Service Commission of Indiana, has been appointed as a member of the commission, succeeding S. R. Artman. Headquarters, Indianapolis, Ind.

THE INTERSTATE COMMERCE COMMISSION has granted to the Delaware & Hudson an extension of time to July 1 for the completion of its installation of automatic train control as required by the commission's second order.

THE INDEPENDENT OFFICES APPROPRIATION BILL, carrying appropriations amounting to \$7,811,314 for the Interstate Commerce Commission for the fiscal year ending June 30, 1928, was passed by the House on January 14 and sent to the Senate. The bill was also passed by the Senate on January 18 without change in or discussion of the commission's appropriation.

AT LINDALE, GA., 18 miles north of Rockmart (the scene of the collision of December 23) the Ponce de Leon express of the Southern Railway (northbound passenger train No. 2) was derailed at a misplaced switch; and reports state that the switch had been maliciously misplaced indicating a deliberate attempt to wreck this train. The engineman was injured, probably fatally, and three cars, as well as the locomotive, were thrown off the rails; but no other person was seriously injured.

THE BOARD OF ARBITRATION which, since December 21, has been considering the claims of employees of the American Railway Express Company for a general increase in wages, has made its report and announces that increases aggregating \$4,500,000 yearly have been awarded, by unanimous vote, the increase to be as of January 1, 1927. The arbitrators were John H. Clarke, former supreme court justice; William B. Wilson and E. A. Stedman. The increases are said to amount to $2\frac{1}{2}$ cents an hour.

THE NEW LIFT SPAN in the White river bridge of the Chicago, Rock Island & Pacific, near De Vall's Bluff, Ark., was

opened for traffic on January 15 by Colonel Carroll Cone, auditor of the State of Arkansas, in the presence of representatives of the railroad and the state and residents of De Vall's Bluff. The new lift span, which forms the primary feature of a structure 2,671 ft. long, has a length of 187 ft. and a vertical lift of 55 ft. The operating machinery embodies a number of distinctive elements of design.

Southeastern Wage Demands Still in Conference

Representatives of the southeastern railroads and of the Brotherhood of Railroad Trainmen and the Order of Railway Conductors have accepted the invitation of Chairman Winslow of the United States Board of Mediation to hold further conferences with the board regarding the wage demands of the brotherhoods, in spite of the strike vote taken by their members on the southeastern lines (except the Southern), which was to be counted on January 20. After the railroad conference committee had refused to apply the award of the board of arbitration in the eastern case in compliance with the demands of the brotherhoods, conferences were broken off while a strike vote was taken to reinforce the original demands for an increase of approximately 19 per cent.

Safety Program for February

L. G. Bentley, chairman of the committee on education, has issued Circular 141, setting forth the program of the Safety Section, A. R. A., for the month of February. It deals with those classes of accidents classified by the Interstate Commerce Commission as "due to slipping or falling." This class is divided by the commission into 48 sub-classes. The sub-class in which are found the largest numbers is "falling from cars and locomotives;" and the circular calls special attention to the fact that, in 1925, one of the weakest features shown in the examination of the statistics was that accidents in train service, due to falls, had not been reduced with as much success as appeared in the records of shopmen and certain other classes. The solu-

tion of the difficulty is to educate men to their responsibility; "the tide can be turned by a combination of good supervision and alert response on the part of employees."

Canadian M. of W. Employees Granted Wage Increase

Raises in wage rates in the maintenance of way departments of Canadian railroads were agreed to by representatives of the railroads in conference with the employees' representatives in Montreal last week, the increases becoming effective January 16.

The increases average about two cents over the previously prevailing hourly rates. First-class yard foremen will henceforth receive \$5.00 per day instead of \$4.80 and ordinary section foremen \$4.55 instead of \$4.40. First year section men will receive 38 cents per hour instead of 36 cents and thereafter 40 cents instead of 38 cents. Bridge and building foremen will receive \$5.60 a day, an increase of 30 cents. Carpenters are raised from 56-60 cents per hour to 58-62 cents; painters from 56 cents to 58 cents; masons from a minimum of 56 cents to a 62-cent minimum; plumbers, tin-smiths, and black-smiths are raised from 70 to 72 cents per hour.

The only important rule change is the provision of a differential in favor of section foremen whose sections include long stretches of tunnel.

Wood's Appointment Before Senate

Confirmation of the President's appointment of Cyrus E. Woods as a member of the Interstate Commerce Commission was expected to be debated in the Senate on January 20 and some of the Senators were expected to make a fight to have the matter discussed in open session, instead of in executive session following the usual custom. Gossip around the Capitol was to the effect that the vote on the question of confirmation, following an adverse vote in the committee on interstate commerce, might be very close. Some observers predicted that if the plan of considering

the case in executive session is adhered to the appointment might be confirmed but that if an open session were held the chances would be against confirmation. This is on the theory that party loyalty is stronger among Senators when the galleries are not open.

Senator Edge of New Jersey replied in the Senate on January 13 to the speech against former Commissioner Frederick I. Cox made by Senator Reed of Pennsylvania at the hearing before the committee, in which Senator Reed spoke of Mr. Cox as a "commercial traveler and ribbon salesman" in contrasting his qualifications for appointment with those of a former ambassador. Senator Edge pointed out that when Mr. Cox was appointed to the commission he was the manager of a large department of one of the largest silk manufacturing concerns in the country and said that he was never a candidate for appointment to the commission but

"was selected as the chosen representative of the American Commercial Travellers' Association."

Electric Railway Traffic Increase

Electric railways experienced a year of even development during 1926, according to a statement issued by Lucius S. Storrs, Managing Director of the American Electric Railway Association.

"There was a gradual increase in traffic in the industry as a whole," the statement said. "This stood out in marked contrast to every other year since the war. They have been characterized by traffic slumps and peaks. Traffic on 217 properties, comprising 85 per cent of the country's total mileage, for the first eleven months of 1926 showed an increase of 1.21 per cent over a similar period for 1925. By far the greater portion of this increase is, of course, found in the metropolitan districts and the large cities.

"Other outstanding achievements were miles of track constructed and reconstructed, cars purchased, new bus lines opened, receiverships lifted, and increased advertising and selling activities.

"Co-ordination of electric railway and bus services under the management of traction companies progressed rapidly. Experience having proven this kind of operation renders better service and is more economical, public officials and company managements generally are striving to bring it about to the fullest possible extent. One great advantage of such operation is that transfer facilities can be arranged.

"As a result of this co-ordination movement more than 7,000 buses now are being operated by approximately 275 electric railway companies over more than 15,000 miles of route. Buses generally are being used in extending transportation routes with but little service paralleling

Revenues and Expenses of Class I Railways in November

Compiled from the monthly reports of 186 steam railways, including 13 switching and terminal companies

Item	United States		Eastern District		Pacahontas Region		Southern Region		Western District	
	1926	1925	1926	1925	1926	1925	1926	1925	1926	1925
Average number of miles operated	237,329.85	236,691.43	59,357.29	59,425.73	5,554.94	5,555.84	39,119.71	38,808.53	133,297.91	132,901.35
Revenues:										
Freight	\$432,665,639	\$402,543,720	\$189,242,606	\$167,795,261	\$23,920,040	\$20,439,293	\$56,874,086	\$55,537,197	\$162,628,907	\$158,771,969
Passenger	677,298,562	681,111,661	39,359,769	39,049,450	1,609,913	1,782,720	10,663,691	13,535,887	25,665,189	26,743,604
Mail	7,942,694	7,976,888	3,049,664	3,022,512	198,253	202,720	1,176,352	1,192,864	3,518,425	3,558,792
Express	13,853,666	13,216,017	6,582,576	6,385,564	310,951	300,648	1,771,344	1,873,454	5,188,795	4,656,351
All other transportation	17,265,922	16,835,203	9,772,499	9,509,516	192,631	196,101	1,062,918	1,069,175	6,237,874	6,060,411
Incidental	11,383,813	10,582,618	5,856,202	5,407,092	490,459	337,818	1,342,241	1,371,698	3,694,911	3,466,010
Joint facility—Cr.	1,088,495	975,971	436,242	324,167	14,346	12,403	150,498	143,174	487,413	496,227
Joint facility—Dr.	465,276	256,711	135,489	36,359	1,786	1,974	37,344	34,474	290,651	183,904
Ry. operating revenues	561,033,525	532,985,367	254,164,069	231,457,203	26,734,807	23,269,729	73,003,786	74,688,975	207,130,863	203,569,460
Expenses:										
Maintenance of way and structures	72,722,556	66,323,178	30,898,229	28,765,507	3,656,109	3,567,354	11,119,901	10,019,892	27,158,317	24,370,625
Maintenance of equipment	108,784,242	104,622,202	53,925,983	50,175,562	4,802,672	4,785,712	14,211,683	13,760,141	35,845,904	35,896,387
Traffic	9,819,549	8,977,987	3,609,126	3,243,316	256,516	233,733	1,774,134	1,682,732	4,179,779	3,818,206
Transportation	193,127,698	186,398,140	92,446,977	86,234,013	6,991,955	6,251,801	25,063,898	25,802,529	68,624,868	68,109,797
Miscellaneous operations	4,461,721	4,533,711	2,173,523	2,178,772	82,523	93,968	496,628	645,420	1,709,047	1,655,551
General	15,436,903	14,729,564	6,881,072	6,749,698	520,084	475,055	2,031,279	1,827,772	6,004,468	5,617,039
Transportation for investment—Cr.	1,681,304	1,035,248	376,560	159,114	62,629	53,906	242,956	132,708	999,159	689,520
Ry. operating expenses	462,573,365	384,549,534	189,468,344	176,747,954	16,227,230	15,357,717	54,454,567	53,665,778	142,523,224	138,778,085
Net revenue from railway operations	158,360,160	148,435,833	64,695,725	54,709,249	10,507,577	7,912,012	18,549,219	21,023,197	64,607,639	64,791,375
Railway tax accruals	35,091,316	31,776,904	13,799,065	11,642,479	2,072,527	1,892,873	4,857,995	4,657,177	14,361,723	13,583,475
Uncollectible ry. rev's	156,924	184,679	25,656	54,581	2,825	4,520	22,548	17,878	45,893	67,700
Ry. operating income	123,111,926	116,475,150	50,811,002	42,972,189	8,432,225	5,014,619	13,668,676	16,348,142	50,200,623	51,140,200
Equip't rents—Dr. bal.	6,460,687	7,097,193	3,599,691	3,201,662	4,660,249	4,728,895	64,431	1,406,325	3,256,814	3,218,101
Joint facility rent—Dr. balance	1,917,679	2,361,599	879,235	1,071,522	126,195	101,749	130,382	97,303	781,867	1,091,025
Net railway operating income	114,733,560	107,016,358	46,332,076	38,699,005	8,766,279	6,641,765	13,473,863	14,844,514	46,161,342	46,831,074
Ratio of expenses to revenues (per cent)	71.77	72.15	74.55	76.36	60.70	66.00	74.59	71.85	68.81	68.17

FOR ELEVEN MONTHS ENDED WITH NOVEMBER, 1926 AND 1925

Average number of miles operated	237,028.22	236,617.33	59,406.79	59,523.04	5,550.03	5,541.69	38,956.08	38,721.69	132,115.32	132,830.91
Revenues:										
Freight	4,426,887,157	4,175,142,851	1,950,864,367	1,828,627,110	232,806,811	205,294,148	606,776,770	574,320,338	1,636,439,200	1,566,901,255
Passenger	695,417,466	694,309,599	480,000,935	476,171,300	20,052,842	21,002,085	139,043,985	142,313,464	314,319,704	324,822,750
Mail	86,342,111	87,237,637	32,887,190	33,386,959	2,236,697	2,259,853	12,937,888	12,619,987	38,280,336	38,970,838
Express	134,532,854	130,905,293	61,988,032	63,264,332	2,956,917	3,050,816	17,749,529	18,200,942	49,838,376	46,289,203
All other transportation	191,376,721	183,400,332	108,136,439	104,089,954	2,530,973	2,250,829	11,549,043	10,890,177	69,160,566	66,169,372
Incidental	124,688,584	116,522,541	62,018,866	57,703,017	4,875,623	3,777,532	14,493,591	13,584,421	42,700,504	41,457,571
Joint facility—Cr.	12,282,072	10,131,044	4,908,700	4,155,979	154,567	174,566	1,566,710	1,504,081	5,652,595	4,296,418
Joint facility—Dr.	4,502,409	2,809,218	1,484,474	902,954	25,003	24,358	379,013	382,946	2,613,919	1,498,960
Ry. operating revenues	5,924,424,556	5,664,740,079	2,701,319,555	2,566,495,697	265,589,127	237,785,471	803,738,512	773,050,464	2,153,777,362	2,087,408,447
Expenses:										
Maintenance of way and structures	805,257,672	761,195,953	341,996,518	323,047,169	36,471,396	35,322,797	117,621,496	109,286,384	309,168,262	293,539,603
Maintenance of equipment	1,183,055,096	1,160,624,483	571,462,361	557,789,812	53,580,910	54,242,555	155,478,811	148,236,132	400,533,014	400,355,984
Traffic	104,730,410	96,753,229	38,473,217	35,910,285	2,740,648	2,517,769	18,686,923	17,286,561	44,829,622	41,038,614
Transportation	2,011,391,335	1,976,744,004	951,832,377	924,219,278	69,036,678	65,167,160	275,932,870	265,059,779	714,589,410	722,297,787
Miscellaneous operations	51,705,813	49,495,322	23,925,273	22,485,130	998,384	977,031	6,121,573	5,904,264	20,670,583	20,123,897
General	169,110,343	161,372,008	77,234,813	72,646,098	5,554,593	5,130,478	22,072,837	20,764,606	64,208,098	62,830,826
Transportation for investment—Cr.	15,073,382	11,482,662	2,087,558	1,773,718	581,485	642,599	2,711,741	2,040,195	9,692,598	7,026,150
Ry. operating expenses	3,107,777,287	2,944,702,337	1,344,837,001	1,234,324,054	167,831,126	162,715,191	593,202,769	564,497,531	1,544,306,391	1,533,165,561
Net revenue from railway operations	1,614,247,269	1,470,037,742	606,482,554	532,171,643	97,758,001	75,070,280	210,535,743	208,552,933	609,470,971	554,242,886
Railway tax accruals	364,480,054	331,520,156	150,229,517	135,395,770	19,331,263	18,094,430	49,781,836	46,245,155	144,637,438	134,779,801
Uncollectible ry. rev's	1,473,533	1,676,536	717,218	812,127	31,986	77,191	195,548	204,480	536,181	582,738
Ry. operating income	1,248,293,282	1,136,841,050	545,035,819	495,963,746	78,391,757	59,893,659	160,548,359	162,103,298	464,297,352	418,880,347
Equip't rents—Dr. bal.	76,177,495	72,068,505	40,530,789	37,229,086	46,183,778	46,336,769	9,419,944	8,410,498	32,410,541	32,065,690
Joint facility rent—Dr. balance	21,851,783	20,763,023	10,267,870	9,274,645	1,096,711	1,018,018	1,268,614	1,306,814	9,278,588	2,263,546
Net railway operating income	1,150,264,004	1,044,009,522	494,297,161	448,760,015	83,478,819	65,212,410	149,879,801	152,485,986	422,608,223	377,551,111
Ratio of expenses to revenues (per cent)	72.75	74.05	74.22	75.37	63.19	68.41	73.81	73.02	71.70	73.45

a Includes \$3,173,104 sleeping and parlor car surcharge. b Includes \$3,263,720 sleeping and parlor car surcharge. c Includes \$38,185,119 sleeping and parlor car surcharge. d Deficit or other reverse item. e Includes \$36,498,732 sleeping and parlor car surcharge.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

the main rail lines. Independent competition is growing less because buses cannot operate profitably at electric railway fares and also because it is no longer possible to purchase efficient buses except upon reasonable financial terms."

Harriman Medals Presented

The gold, silver and bronze medals, for a year's safety record, awarded recently to the Union Pacific, the Duluth, Missabe & Northern and the Green Bay & Western, as noticed in the *Railway Age* of December 11 and 18, were presented to officers of those roads at a luncheon given in New York city on January 13, by Elbert H. Gary, at which were entertained a large number of railroad officers and safety specialists, including the following, who received the medals: C. R. Gray, president of the Union Pacific; W. A. McGonagle, president of the D. M. & N.; and Charles W. Cox, secretary-treasurer of the Green Bay & Western. Judge Gary, in appropriate remarks to each recipient, referred to the experience of the United States Steel Corporation in its activities, during the past 15 years, looking to the promotion of safety, sanitation and general welfare of employees; and said that the corporation in those 15 years had spent for these purposes about \$160,000,000. He continued: "We have received our money back over and over again. I would like to ring in the ears of every living soul on earth that wherever they are, whatever they are doing, whomsoever they are associated with or come in contact with it will pay them in dollars and cents if all the time they will observe the requirements of the Golden Rule."

"Don't Preach Without Practicing," Says L. S. Miller

Leverett S. Miller, president of the New York, Westchester & Boston, speaking recently in New York before the Metropolitan Section of the American Electric Railway Association and discussing the art of maintaining the best public relations, reminded his hearers that—

"A publicity department alone will not popularize your service. Nor will it take you far along the road to success. You must practice what you preach and if you do not practice it you had better not preach it. Our railways should have a Billy Sunday to do for them what Sunday has done to popularize religion. We must learn to talk to our people simply, truthfully, and courageously. We must not try to force the public to believe that we are sincere and honest of purpose; we must actually be sincere and honest. We must give the public the facts and let the public draw its own conclusions. If our proposition is fair and has been clearly stated the chances are that the public will be with us. The public is a partner in our transportation problems and intensified team work is required in order to promote our mutual interest. To accomplish this, it is necessary for the public to be kept informed of what is going on in the railroad world. It is our job to see that we and our friends circulate correct and proper information in such form the man on the street may understand it."

The Grand Trunk launched its second new steel car ferry, the *Madison*, at Manitowoc, Wis., on January 19.

The Northwest Shippers' Advisory Board will hold its fourth annual meeting at Minneapolis, Minn., on January 25.

The Southwest Shippers' Advisory Board will hold its fourteenth regular meeting at the Gunter Hotel, San Antonio, Tex., on February 4.

A total of 426 new industries, with a property valuation in excess of \$5,000,000, were located along the St. Louis-San Francisco during 1926 as compared with 401 industries in 1925. Oil distributing plants established totalled 101 and oil well supply houses 72.

The Bay Ridge freight station of the Long Island R.R. (South Brooklyn, N. Y.) has been established at Second avenue and Fifty-eighth street, the premises at Sixth avenue and Sixty-fifth street having been vacated. The new yard has team track capacity for 185 cars.

The Women's Traffic Club of Los Angeles, Cal., held its regular meeting on January 5. The speakers were Stewart McKee and Ella A. Hausen. An educational committee was appointed. On January 29, the club will give a dance at the Los Angeles Transportation Club.

The National Air Transport, Inc., will commence the operation of an airplane line to handle express shipments between New York, Cleveland, Ohio, and Chicago, on April 15. The company also plans to inaugurate passenger service between Kansas City, Mo., and St. Louis about February 1.

The Interstate Commerce Commission announced on January 13 that it has designated Warren H. Wagner as an additional assistant chief examiner in the Bureau of Formal Cases, and especially assigned him to the commission's general rate structure investigation, No. 17,000, which the commission has undertaken in accordance with the Hoch-Smith resolution adopted by Congress last year.

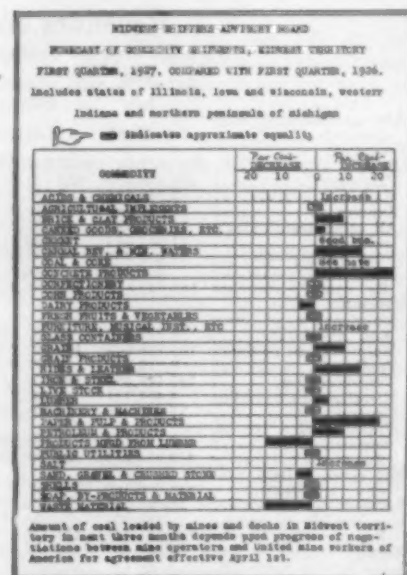
The Atlantic States Shippers' Advisory Board held its regular meeting at Baltimore, Md., on January 13, with an attendance of about 500. The building trades—cement, clay, clay products, and brick—expect a decrease in the volume of business during the next three months, but substantially all other industries anticipate good business and in some cases an increase is predicted. Not a single major complaint was filed by any shipper, and practically all industries reported excellent railroad service.

The New England Shippers' Advisory Board will hold its fifth regular meeting at Kimball Hotel, Springfield, Mass., on January 27. Among the speakers scheduled are W. C. Kendall, A. R. A.; William King,

freight claim agent of the New Haven; George B. Ager, special agent of the Boston & Albany and A. P. Russell, vice-president of the New Haven. The Traffic Club of Springfield, D. L. Topham, president, is to give a dinner on the evening of the 26th, with the expectation that a large number of the members of the Shippers' Advisory Board will be present.

Forecast of Freight Shipments Illustrated Graphically

The Midwest Shippers' Advisory Board, in order to simplify reports on the forecast of commodity shipments within the territory during a future quarter has



adopted a graph from which the increase or decrease to be expected can be seen at a glance. The first graph, reproduced here reduced in size, was prepared for the meeting at Chicago on January 12.

New Frisco Train

The St. Louis-San Francisco has put on a new train, the "Sunnyland," between St. Louis, Mo., and Memphis, Tenn.; a companion to the through Florida train, the "Sunnyland" which is operated between Kansas City, Mo., and Birmingham, Ala. The new train will leave St. Louis at 1 p. m. and arrive in Memphis at 9 p. m., while returning it will leave Memphis at 8 a. m. and arrive in St. Louis at 4 p. m. It will connect in both directions with the Florida train. Also the schedule of the "Meteor" from Oklahoma City, Okla., to St. Louis, Mo., has been changed so that it leaves Oklahoma City at 4 p. m. and will arrive in St. Louis the next morning at 7:59. The service of the "Meteor" from Oklahoma City to St. Louis will be supplemented by a new train, No. 6, which will leave Oklahoma

City at 1:30 p. m. and arrive in St. Louis at 7:35 a. m. No. 6, while a local train in Oklahoma, will be a fast through train from Monett, Mo., to St. Louis. The effect of the change is to make the "Meteor" a solid through train from Oklahoma to St. Louis and the business from Oklahoma to Memphis and the southeast which has heretofore moved on the "Meteor," will, with the change, be handled on train No. 6 to Springfield where connection will be made with the Kansas City-Florida special.

Freight Traffic for November and Eleven Months

The freight moved by the railroads in the first eleven months of 1926, according to compilations made by the Bureau of Railway Economics, amounted to 448,530,149,000 net ton miles, which exceeded by 24,350,166,000 net ton miles, or 5.7 per cent, the previous record for a corresponding period—in 1923. It also exceeded by 30,299,074,000 net ton miles, or 7.2 per cent, the figure for the corresponding period in 1925.

In the Eastern district there was an increase of 9.4 per cent, as compared with 1925, while the Southern district showed an increase of 7.2 per cent, and the Western district an increase of 4.5 per cent.

The railroads in November also handled the greatest freight traffic for any November on record, 43,342,133,000 net ton miles, an increase of 2,567,549,000 net ton miles or 6.3 per cent as compared with November, 1925. Railroads in the Eastern district showed an increase in November of 12.3 per cent, while the Southern district showed an increase of 2.7 per cent and the Western district a decrease of one-half of one per cent.

The daily average movement of freight cars in November was 32.1 miles, the highest average ever reported for any November on record, exceeding that for November, 1925, by 1.1 miles. The average for the first eleven months in 1926 was 30.5 miles, an increase of two miles over that of the same period in 1925.

The average load per car in November was 28.5 tons, an increase of 1.3 tons over that for November, 1925, and an increase of 1.3 tons above that of the same month in 1924. The average for the first eleven months in 1926 was 27.3 tons, compared with 26.9 tons in 1925.

Miners' Union Tells How to Regulate Freight Rates

Urging the Interstate Commerce Commission to "see the mine worker's side of the freight rate question," District No. 12 of the United Mine Workers of America has filed a brief with the commission in connection with the lake cargo coal rate case suggesting that the commission assist in protecting the union wage scales of the miners in the unionized coal fields by advancing the freight rates from the southern district coal fields which are operated by non-union miners. The case involves the relation of rates on bituminous coal from the various producing districts to the lake ports and the Northwest, and was started by a com-

plaint filed by the Pennsylvania coal operators asking a reduction in their rates or an increase in their differentials under the rates from the southern district.

The brief contends that if any reduction is made in the rates of the Pennsylvania operators a greater reduction should be made to apply to the coal shipped from Illinois, "in order to re-establish the rates upon which the Illinois coal industry was established, built up and continued." However, it suggests, "Perhaps a happier solution of the problem would be an increase in the rates from the preferred southern districts," and it is asserted that under the present rate structure coal from the southern fields has to a large extent displaced in the markets coal from the Illinois fields nearer to the markets.

"Economically an increase (in the rates from the southern districts) would be sound, morally it would be justified," the brief continues. "It would stabilize the coal industry and it would encourage the southern districts to develop a market in their own geographical territory, the East and the South. It would also protect the existing wage scale in non-preferred districts which the President so well has said must be protected if our prosperity is to continue.

A determination that a given freight rate is or is not reasonable, the lowering, the raising, or the changing of an existing rate logically and essentially affects the prosperity of the coal industry existing in some locality in this country. If, as shown above, the coal miner is an essential, a living and throbbing component of the coal industry, then a change in freight rates affects his prosperity in that it may have some direct effect upon his wages or the amount of work he can get. So it must be seen by all except those who may be blinded by prejudice or passion that the wage rate should be and is a most important factor in determining the freight rate to be applied as between varied and competing districts. * * * Indeed this commission has heretofore decided that wage scales properly are and must be taken into consideration in determining relative freight rates. * * * But for some inexplicable reason the commission in subsequent decisions failed to follow the principle announced and in a series of cases revised freight rates, very much to the prejudice of the Illinois coal fields. As a result the coal shipped from the Illinois fields to the Northwest has constantly decreased in amount while the coal shipped from the fields so favored by the commission have constantly increased in amount."

Iron and Steel Rate Investigation

The Interstate Commerce Commission has issued a notice outlining the procedure to be followed in its investigation of carload rates on iron and steel in official territory, as part of its general rate structure investigation, including an appendix listing a large amount of statistical information regarding the rates which is to be furnished by the carriers. The proceedings are assigned for hearing before Commissioner Campbell and Examiners Faul and Bardwell at Pittsburgh

beginning on March 16, Columbus on April 19, Detroit on April 25 and Chicago on May 12. Since the issuance of the previous notice a number of new complaints attacking the rates have been filed with the commission but the notice says that the filing of separate complaints is not necessary. The notice also says in part:

With the thought of avoiding duplication of data peculiarly within the knowledge of the carriers it was suggested at the preliminary conference in New York City on December 4, 1926, that the interested carriers prepare in exhibit form certain information of a general nature for use by all parties. The data called for in Appendix A should, therefore, be prepared under the direction of the carriers' committees. Copies thereof should be submitted direct to the state commissions interested, to the various shippers' committees appointed at the New York conference on December 4, and ten copies mailed to this commission for its use.

It is hoped that the carriers will be able to have the data called for ready for distribution to the various parties by March 1.

The scope of this investigation is limited to all-rail rates, carloads, within official territory, applicable to the commodities named in Appendix B. Complainants are therefore requested to advise the commission promptly whether they desire hearings in separate proceedings on any of the articles included in their complaints but not included within the scope of this investigation and, if so, to enumerate the specific articles.

The carriers will be expected at the initial hearings in Pittsburgh, beginning March 16, formally to introduce the exhibits showing the information called for and to make such explanation thereof as may be necessary. The parties will be expected to cross-examine the carriers' witnesses at the Pittsburgh hearing. Immediately upon the conclusion of the cross-examination of carrier witnesses at the Pittsburgh hearing such complainants as desire to proceed at Pittsburgh will be accorded the opportunity to do so.

At the Columbus hearing the carriers will be expected to present their complete testimony concerning No. 17878. (Rates in Ohio.) Thereafter, testimony will be received on behalf of others interested in that proceeding. Following that such complainants as desire to proceed at that place may do so. Complainants preferring to present their cases at Detroit or Chicago will be accorded that opportunity.

Any state commissions or other parties not complainants may present testimony at any of the places named above after the complainants have made their presentation. It will be expected that the carriers will make their reply at the Chicago hearing.

GEORGE B. MCGINTY,
Secretary.

LEE DENNIS, member and chairman of the Board of Railroad Commissioners of Montana from 1919 to 1924, has been again elected to the commission, succeeding Commissioner S. M. Ross.

Foreign

British Railways Secure Freight Rate Increase

The British Railway Rates Tribunal has granted the carriers an increase of 50-60 per cent over the 1913 rate basis, or 10 per cent over existing rates, the new schedules to come into effect February 1. No advance has been ordered in passenger fares. Criticism of the increase is understood to be quite general among shippers.

Russian Railways Expect \$127,102,000 Operating Net

The budget of the railway system of the Soviet Union for the current fiscal year ending September 30, next, received by the Russian Information Bureau, Washington, D. C., from the Commissariat for Transport at Moscow, gives an estimated net from operation for the year of \$127,102,000. Receipts, estimated on a freight volume of 133,000,000 metric tons, are \$829,819,500 and expenditures \$702,717,500. The railway system first began showing a favorable balance in 1924-25.

According to the State Planning Commission, \$130,295,000 will be expended during the year on improvements and extensions, including about 1,400 miles of new lines. This outlay will virtually be covered by the profits from operation for the year.

Egypt Extends Railways

The official inauguration by the Egyptian government of the new standard gage railway line between Luxor and Shellal marks the advent of a new era in transportation in Egypt, states Assistant Trade Commissioner W. D. Mann, Alexandria, in a report to the Department of Commerce. The immediate benefit, aside from greater comfort to tourists visiting the popular Asswan winter resort, will be a considerable shortening in the travel time between Cairo and Khartoum together with the elimination of expensive freight handling at Luxor for merchandise going to or coming from the Sudan.

The length of the new road is 135 miles. The work was done under the supervision of British engineers in about 280 days and with a capital outlay of approximately \$1,340,000.

Benguella Railway Nearing Completion

The Benguella Railway, which is now approaching completion, according to the Times (London), will bring a vast area that is eminently suitable for white settlement over 2,000 miles nearer the European markets. It will extend from Lobito bay, a great natural harbor on the west coast of Africa, to a connection with the Katanga Railway, which is a northern extension of the Rhodesian Railways, and will thus provide a western outlet for Central Africa. The line is so far advanced that

an organized motor-car service connects the railhead with the Katanga Railway, excellent accommodation being provided for passengers *en route*.

The primary function of the Benguella Railway will be to shorten and improve the transport connections of the Union Minière du Haut Katanga, which is one of the four largest copper-producing companies in the world.

The Benguella Railway is a water-shed route, with a steady down-grade haul to the coast. It will be able to carry an immense mineral traffic from the Katanga, and offer facilities for the export of Central Africa's beef cattle, the profitable market for which is now largely limited to the beef requirements of nearby mining populations.

Many Special Passenger Rates to Be Offered in Britain

A large and increased number of cheap fares and improved facilities are to be looked for from British railways in 1927. The popularity of the long distance day excursions at fares considerably below the single fare for the round trip and of the half-day excursions from town to town and from town to seaside and other pleasure resorts at low fares has resulted in a great increase in the number and variety of these trips. Long and short period excursions to all parts of the Kingdom will again be given from May to October at fares of two cents per mile, and tourist tickets and circular tour tickets during the same period. Pleasure parties of 12 and upwards will this year be able to obtain tickets at a fare and a third for the round trip, available for three days instead of one day as hitherto.

Week-end tickets, also at fares of two cents per mile, by ordinary train to all parts of the country and the numerous other reduced rates to local events, such as flower and agricultural shows, markets, football and cricket matches, bazaars and other similar functions will be continued.

The radius of reduced rates to London on Sundays has been increased from 40 to 60 miles. The number of cheap tickets for shopping and theatre visits are being largely extended, and at large centers of population throughout the country cheap first and third class day trips at single fares or less, to and from various points, available as a rule by any train daily after 10 a. m. on weekdays and by any train on Sundays are also being considerably increased.

Miscellaneous

The Department of Commerce has received the following reports from its agents in various parts of the world:

A decree is expected shortly to authorize the expenditure of 30,000,000 pesos (\$12,750,000) for construction of new lines on the Argentine State Railways. Some of these lines are already nearly finished, their completion having been held up for some time for lack of funds. It is the plan of the Minister of Public Works that sixteen of these new branches shall be finished within the term of President Alvear, which closes in October, 1928.

Equipment and Supplies

Locomotives

THE CANADIAN NATIONAL is inquiring for four Mountain type locomotives, 10 eight-wheel switching locomotives, 20, 2-8-4 type locomotives and from 20 to 40, 4-8-4 type locomotives.

Freight Cars

THE CHICAGO & NORTH WESTERN is inquiring for 500 hopper cars of 70 tons' capacity.

THE SOUTH AFRICAN RAILWAYS have ordered 25 tank cars from the Standard Steel Car Company.

THE UNION REFRIGERATOR TRANSIT COMPANY has ordered 500 refrigerator cars from the American Car & Foundry Company.

THE GOODWIN-GALLAGHER SAND & GRAVEL CORPORATION has ordered eight all steel hopper cars of 20 tons' capacity from the Magor Car Corporation.

THE BUFFALO, ROCHESTER & PITTSBURGH has given an order for making repairs to 500 gondola cars to the American Car & Foundry Company.

THE BALTIMORE & OHIO has equally divided an order for 2,000 hopper cars between the Bethlehem Steel Company and the Standard Steel Car Company.

THE CANADIAN NATIONAL is inquiring for 1,000 steel frame box cars of 60 tons' capacity. This is in addition to the inquiry for 1,100 cars reported in the *Railway Age* of January 15.

THE TIDE WATER OIL COMPANY has ordered 200 tank cars of 8,000 gal. capacity from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of January 8.

THE WABASH has ordered 500 automobile box cars from the American Car & Foundry Company and 500 from the Standard Steel Car Company. Inquiry for this equipment was reported in the *Railway Age* of January 15.

THE MOBILE & OHIO has ordered 250 steel underframe flat cars, 200 steel frame hopper cars and 250 steel frame gondola cars, all of 50 tons' capacity from the Chickasaw Shipbuilding Corporation, a total of 700 cars, instead of 600 cars as reported in the *Railway Age* of January 15.

Passenger Cars

THE NEW YORK CENTRAL is inquiring for 19 gas-electric rail motor cars 70 feet long.

THE CHICAGO, MILWAUKEE & ST. PAUL is inquiring for 10 gasoline-electric cars.

THE MOBILE & OHIO has ordered two steel rail motor trailer cars from the J. G. Brill Company.

THE WABASH is inquiring for 12 combination passenger and baggage cars, 10 chair cars, 8 coaches, 6 dining cars, 2 cafe chair cars and 4 lounge cars.

THE CHICAGO MILWAUKEE & ST. PAUL has placed an order for 5 gas-electric motor cars equipped with Electro-Motive Company's power plants.

THE GULF, MOBILE & NORTHERN has ordered two steel passenger coaches, 70 ft. long, from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of December 11.

THE CANADIAN NATIONAL is inquiring for 25 first-class coaches, 13 dining cars, 20 standard sleeping cars, 5 compartment sleeping cars, 4 combination baggage and smoking cars and 12 baggage cars for service on Canadian lines. This company, as reported in the *Railway Age* of January 15, is also inquiring for 2 combination mail and express cars and 6 baggage cars for service on the Grand Trunk Western.

Machinery and Tools

THE MOBILE & OHIO has ordered one 150-ton wrecking crane from the Industrial Works.

THE UNION PACIFIC has ordered one bucket-handling gantry crane from the Whiting Corporation.

THE CHICAGO, BURLINGTON & QUINCY has ordered one pile driver from the American Hoist & Derrick Company.

Signaling

THE READING has awarded a contract to the Union Switch & Signal Company for the installation of its continuous automatic train control on its line from Jenkintown, Pa., northward to Bethlehem, Pa., 45 miles, double track. There will be automatic substations for supplying power at Jenkintown and Bethlehem and an emergency automatic substation at Orville, about midway between the towns first named. This is the second installation to be made by the Reading. The number of locomotives to be equipped is 80.

Miscellaneous

mitsui & Co., New York are inquiring for locomotive parts including boiler tubes, tires, axles and springs, for export to Japan.

THE PENNSYLVANIA is inquiring for miscellaneous material including 18,000 tons of steel plates, 7,000 tons of bars, 700 tons of sheets, 700 tons of shapes, 25,000 car and locomotive wheels and quantities of other materials.

Supply Trade

J. O. Dearth has been appointed district sales manager of the **Central Alloy Steel Corporation**, Massillon, Ohio, with headquarters at Cincinnati, Ohio.

O'Neill Ryan, Jr., advertising manager of the **Celotex Company**, Chicago, has been promoted to assistant general sales manager in charge of sales promotion, and will be succeeded by **Edwin Cox**.

The **Worthington Pump & Machinery Corporation** has bought the **Harris Air Pump Company** of Indianapolis, Ind., manufacturers of air lift systems and air lift pumps. The purchase was outright and includes patents, drawings, patterns and good-will.

H. M. Wey, formerly district manager of the Pittsburgh Testing Laboratories, with headquarters at Chicago, has been appointed representative of the Wellsworth safety division of the **American Optical Company**, with headquarters at Chicago.

The **North American Car Corporation** has purchased the plant of the North Judson Car & Equipment Company, North Judson, Ind., and will use the plant for the repair and distribution of their tank cars, refrigerators and the poultry cars of the Palace Poultry Car Company, one of its subsidiaries.

The **Western Electric Company** has organized the **Electrical Research Products, Inc.**, of Wilmington, Del., as a subsidiary corporation to take over that portion of Western Electric business which is not related to the manufacture and distribution of telephone apparatus and supplies for the Bell System. All of the new corporation's stock is owned by the Western Electric Company. The Electrical Research Products, Inc., will have charge of the commercial development of electrical devices and inventions controlled by the parent company and not suitable for distribution through the **Graybar Electric Company**, its subsidiary operating in the distribution of electrical supplies. J. E. Otterson, general commercial manager of the Western Electric, has been appointed general manager of Electrical Research Products, Inc., with office at 195 Broadway, New York.

J. A. White, formerly manager of the electrical department of Charles A. Strelinger Company, Detroit, Mich., has been appointed district manager of the Detroit office recently opened by the **Allen-Bradley Company**, Milwaukee, Wis. Mr. White, previous to his connection with the Strelinger Company, was connected for over six years with the industrial sales department of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa. **George F. Pain**, formerly manager of the electrical department of the Balti-

more branch of the Fairbanks-Morse Company, has been appointed district manager in charge of the Philadelphia, Pa., office of the Allen-Bradley Company, with office at 21 Bulletin building. Mr. Pain was connected with the Fairbanks-Morse Company for over 13 years, in charge of the electrical departments of the New York, Baltimore and Philadelphia offices.

J. F. Prettyman & Sons are now building a large creosoting plant at Charleston, S. C., which it is estimated will have a capacity for treating 55,000,000 board feet of timber annually, and provide storage space for 1,100,000 ties in addition to a large area for the storage and seasoning of piles, poles and other timber. This plant, which was designed and is being constructed under the supervision of Grant B. Shipley, engineer, Pittsburgh, Pa., will cover an area of about 47 acres and will be served by a 500-ft. wharf along the Ashley river, as well as by direct rail connections with the Atlantic Coast Line, the Seaboard Air Line and the Southern. The new plant will be modern in every detail and in addition to providing facilities for the storage, seasoning, treating and handling of timbers under most favorable conditions, will include a tie adzing and boring mill and a timber framing plant.

Obituary

Frederick Hackmann, president of the Hackmann Railway Supply Company, Chicago, died on January 17.

William H. Hodgins, secretary of the Okonite Company, died after a brief illness on January 7 at his home in Glen Ridge, N. J. Mr. Hodgins had been associated with the Okonite Company for over 40 years, and served for many years as a director in addition to his office as secretary.

Walter C. Kershaw, service engineer of the Elwell-Parker Electric Company, at New York, died suddenly on December 24 at his home in Asbury Park, N. J. Mr. Kershaw, previous to service with the Elwell-Parker Electric Company, had been for a number of years with the Pennsylvania Railroad.

THE LOUISVILLE & NASHVILLE has taken over the operation of the Cumberland & Manchester, and all trains will be run to and from the L. & N. station at Barbourville. The station at Heidrick will be abandoned. This road of 27 miles extending from Barbourville, Ky., northward to Manchester was bought by the Louisville & Nashville early last year. Local reports indicate an expectation that the road will be extended northward from Manchester.

Construction

CANADIAN PACIFIC.—This company will construct new engine terminal and shop facilities at Toronto, Ont., to cost approximately \$3,000,000.

CHICAGO, BURLINGTON & QUINCY.—A contract for the construction of a three-story passenger station and office building at Lincoln, Neb., has been awarded to Peter Kiewits Sons, Omaha, Neb. The total expenditure involved in the construction of the building, including rearrangement of track facilities, is about \$950,000. Besides this company, the Union Pacific, as a tenant, will use the station. The operating, engineering and mechanical forces now located at Lincoln will be housed in the office building.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—This company has authorized the construction of a locomotive repair shop at Lafayette, Ind., estimated to cost about \$275,000.

DELAWARE, LACKAWANNA & WESTERN.—This company has awarded a contract to H. F. Curtis for the construction of a highway culvert near its Hackensack River bridge in the Jersey meadows between Newark, N. J., and Hoboken.

MANITOBA & NORTHWESTERN.—This company has applied to the Canadian Parliament for permission to construct a line

from Theodore, Sask., westerly and south-westerly to Duval, about 100 miles.

MISSOURI PACIFIC.—A contract has been let to Winston Brothers Company, St. Louis, Mo., for the grading and bridging for three additional units of second track between St. Louis, Mo., and Jefferson City. The estimated cost of the work, \$3,425,000, covers the territory from Labadie, Mo., to Washington, 9.4 miles; from 3 miles east of Hermann, Mo., to a point 1.4 miles west of Gasconade, 11.4 miles, and from Isbell, Mo., to Osage, 8 miles. Authorization has been made for the enlargement of the roundhouse and improvement of roundhouse facilities at Memphis, Tenn., at an estimated cost of \$13,000, while additional trackage and team track facilities will be constructed at the Georgia and Calhoun Avenue freight yards and at the Sargent yard at a cost of about \$39,500. This company also contemplates the construction of a bridge across the Mississippi river near St. Louis within the next four years at an estimated cost of \$9,000,000.

ST. LOUIS-SAN FRANCISCO.—A contract for the construction of a brick passenger and freight station at Boynton, Okla., estimated to cost \$15,000, has been awarded to J. H. Reddick, Ft. Smith, Ark. Bids closed on January 20 for the grading and bridging of the extension between Aliceville, Ala., and Kimbrough.

sending the holders of \$18,000,000 of bonds, in a brief filed with the Interstate Commerce Commission in connection with its investigation of the affairs of that road asks the commission to find in its report that the receivership was brought about by the bankers in order that they might procure a readjustment of the company's capital structure. Among other findings which the commission is asked to make are:

"That the primary cause of the financial condition of the railway has been the financial drain incident to the construction and operation of the Puget Sound extension. That the extension was built without adequate investigation of costs, of prospective traffic, or probable earnings. That any sound reorganization should recognize this fact, and should so far as practicable, relieve the eastern lines of the burden of interest charges upon the indebtedness secured only upon the Puget Sound extension.

"That the railway has in recent years been controlled by a board of directors representing former holders of large blocks of securities, who (with one conspicuous exception) had liquidated their holdings during the years preceding the receivership, and had at that time no substantial stake in the welfare of the railway.

"That the only constructive efforts to avoid a receivership came from two large holders of St. Paul securities, who had not liquidated their holdings at the prospect of trouble, namely Mr. E. S. Harkness and Mr. E. C. Jameson.

"That the president of the railway, while a practical operating man of considerable experience, had no experience in financial matters, and had to rely, in all such matters, on the judgment and advice of the railway's bankers.

"That a contributing cause of the receivership was the low level of rates prevailing in the western district, and that the railway should proceed energetically, by invoking the authority of the commission where necessary, to procure such revision of the rate structure in that territory as will secure for the railway a fair return on its property."

CHICAGO, ROCK ISLAND & PACIFIC.—**Bonds.**—The Interstate Commerce Commission has granted authority to pledge and repledge from time to time all or any part of \$450,000 of first and refunding mortgage bonds as collateral security for short term notes.

GEORGIA & FLORIDA.—**Government Loan.**—The Interstate Commerce Commission has extended to January 31, 1936, the maturity of a government loan made to the receiver of this company, which will expire on January 31, as part of the plan for the reorganization of the road. The loan will be secured by an endorsement of the new company, the Georgia & Florida Railroad, and by the pledge of \$1,100,000 of first mortgage 6 per cent bonds.

GREAT NORTHERN.—**Tabloid Annual Report.**—The tabloid annual report which will be mailed to stockholders with their February 1 dividend checks shows net income

Railway Finance

ATCHISON, TOPEKA & SANTA FE.—**Leases.**—This company has applied to the Interstate Commerce Commission for authority to acquire control by lease of an extension of the California, Arizona & Santa Fe from Beardsley, Ariz., southerly 15 miles, and also of the Pecos River, extending from Pecos, Tex., in a northerly direction to the dividing line between Texas and New Mexico.

CHICAGO, MILWAUKEE & ST. PAUL.—**Sale Confirmed.**—The sale of the Chicago, Milwaukee & St. Paul which took place at Butte, Mont., on November 26, was formally approved on January 19 by Federal Judge James H. Wilkerson at Chicago. In announcing his approval Judge Wilkerson overruled the protests of the Jameson group of junior bondholders stating that the provisions of the reorganization plan affecting the respective properties of all persons and all corporations interested in the railway and its property are equitable. His decree provides that if Congress, at this session, enacts pending legislation to fund at low interest the St. Paul's indebtedness to the government of \$55,000,000, a modification of the present reorganization plan

must be made. The decree provides that the deed to the property shall not be turned over to the new purchasers until the Interstate Commerce Commission has approved the manner of the turning over of the securities and other financial matters.

CHICAGO, MILWAUKEE & ST. PAUL.—**Management Criticized by Bondholders.**—The bondholders' defense committee, repre-

GREAT NORTHERN

	1926 (Approximate)	1925	1922-1926 Five Year Average
Revenue from freight transportation.....	\$93,193,000	\$90,698,763	\$88,235,229
Revenue from passenger transportation.....	13,045,000	13,955,742	14,221,364
Revenue from mail, express and other sources.....	10,960,000	10,870,455	10,723,162
Total railway operating revenues.....	\$117,200,000	\$115,524,960	\$113,179,755
Railway operating expenses.....	75,025,000	75,227,228	78,490,181
Net revenue from railway operations.....	\$42,175,000	\$39,097,732	\$34,689,574
Taxes.....	9,715,000	9,801,946	9,397,128
Equipment and joint facility rents—Dr.....	1,200,000	1,010,543	143,234
Net railway operating income.....	\$21,260,000	\$28,276,193	\$25,149,212
Other income.....	\$13,200,000	\$11,428,248	\$11,416,478
Total income.....	\$44,460,000	\$39,704,431	\$36,565,690
Income deductions:			
Interest.....	\$17,930,000	\$17,591,927	\$17,060,203
Other.....	530,000	677,108	643,364
Balance for dividends and other corporate purposes.....	\$26,000,000	\$21,435,396	\$18,862,123

* Includes \$8,301,790 dividend from C. B. & Q. stock. † Includes \$8,050,000 interest on bonds issued for purchase of C. B. & Q. stock.

after fixed charges of \$26,000,000 equivalent to \$10.42 per share outstanding. Net income in 1925 was \$21,435,396 or \$8.57 per share.

President Budd points out that the net railway operating income for 1926 equalled 5.57 per cent of the property investment as compared with 5.16 per cent in 1925. He also stated:

The increase in net earnings has been due largely to improvements and additions, such as reducing curves and grades, building new second track, longer passing tracks, and better terminal and shop facilities; and also to improvements in the existing equipment and the acquisition of larger and better locomotives and cars. During the six years since Federal Control \$93,000,000 has been expended for such additions and improvements to roadway and equipment. It should also be said that the splendid cooperation of the employees with the management and with the shippers has aided greatly in getting better results.

It is too early to forecast business for 1927. Agriculture is the predominant industry in Great Northern territory. In contrast with the deficiency of precipitation in the late months of 1925, there has been an excess since last August, and the country is now blanketed with a normal amount of snow. There is a large acreage of fall plowing which, together with good moisture conditions, promises a favorable start for the 1927 crop.

MINNEAPOLIS & ST. LOUIS.—*Receiver's Certificates*.—The Interstate Commerce Commission has granted authority to issue \$275,000 receiver's certificates to extend or refund certificates of a like amount maturing in January and February, 1927.

NEW YORK CENTRAL.—*Leases*.—Hearings were held before Director C. D. Mahaffie of the Interstate Commerce Commission's Bureau of Finance on January 13, 14, 15 and 16 on this company's application for authority to lease the Michigan Central and the Cleveland, Cincinnati, Chicago & St. Louis. P. E. Crowley, president of the New York Central, testified briefly that it was hoped that by unification and single operation of the properties many economies could be effected and better service be given to the public, and many other New York Central officers gave detailed testimony supported by voluminous exhibits. A. H. Harris, vice-president, testified regarding the financial conditions of the roads and in defence of the terms of the proposed leases, which were attacked by a committee of minority stockholders of the Big Four, represented by Elihu Root, Jr., and F. A. Henry, representing C. H. Verner, a minority stockholder of the Michigan Central. Mr. Harris said the proposed payment of \$50 a share on Michigan Central stock and \$10 on the Big Four stock, as rental, is fair, although the companies have in recent years shown greater earnings per share, because no company can afford to pay out all of its earnings in dividends and the lessee takes the risk of unfavorable years. J. E. Oldham, investment banker, of Boston, also testified that these provisions of the leases are reasonable. Mr. Root cross-examined both Mr. Harris and Mr. Oldham at length as to why the rental should not be more nearly the amount of the earnings in recent years. Mr. Crowley said that he recognized his duty to the Big Four stockholders as well as to the New York Central and that he had tried to arrive at terms fair to both sides, but he said he also had to consider what the commission might find to be in the public interest. T. A. Hamilton, consulting railroad expert, testified as to the results of

a study of the condition, earnings and prospects of the Big Four, in relation to the proposed rental. C. H. Verner took the stand and argued that a connecting road ought to be willing to pay \$100 a share rental for the Michigan Central, and when asked if he knew of such a road he said he would deposit \$100,000 earnest money and offer to lease the Michigan Central at \$70 a share.

SEABOARD AIR LINE.—*Lease of Tampa & Gulf Coast*.—The Interstate Commerce Commission has authorized a lease by the Seaboard Air Line of the Tampa & Gulf Coast, built in its interest and which owns the Seaboard lines from Gulf Coast Junction, Fla., to St. Petersburg, from Tarpon Junction to Tarpon Springs, from Lake Villa to Port Richie and from Indiana Beach Junction to Anona, totaling 78.27 miles.

SOUTHERN PACIFIC.—*Bond Issue and Purchase of Oregon Lines*.—Authority for the purchase of the properties of the Oregon & California, 682.82 miles, and of the Marion & Linn County, 2.24 miles and a partially completed line of 8.47 miles, is asked in an application filed with the Interstate Commerce Commission, together with authority for an issue of not to exceed \$100,000,000 of Oregon Lines first mortgage 4½ per cent 50-year bonds. The bonds are to be secured by mortgage on the combined properties in Oregon, including 488.87 miles acquired from the Oregon company in 1915, and are to be issued from time to time in series. For the present authority is asked only for the authentication and delivery of \$61,294,000 of the bonds, of which \$46,000,000 is to reimburse the treasury of the Southern Pacific for expenditures on the properties and \$15,294,000 to retire a bond issue of the Oregon & California maturing on July 1. Authority is asked to pledge and repledge the \$46,000,000 of bonds from time to time as collateral for short-term notes but it is not proposed to sell any at this time.

The Southern Pacific already owns the stock of the two companies except director's shares but the proposed acquisition of direct ownership is a "financial necessity," the application says, in the sense that, in connection with the proposed issue of securities, it will afford the means at a minimum cost of meeting the financial obligations and requirements which must be met in the near future. The property of the Oregon company is said to have a book investment value, as of December 31, 1925, of \$51,139,369, and the purchase price to be paid is \$35,879,987, arrived at by deducting the amount represented by outstanding bonds. A part of the purchase price also will be employed to discharge indebtedness due the Southern Pacific from the Oregon company for advances from time to time, amounting to \$15,414,242, the purchase price for the Marion & Linn County is \$36,332.

According to the application the investment value of the properties acquired in 1915 is \$27,752,171 plus \$5,484,800 for additions and betterments. Adding these items to the capital assets now to be acquired a total of \$83,996,351 is obtained as

the value of assets now to be capitalized by the Southern Pacific.

TEXAS PANHANDLE & GULF.—*Authorization for Securities Denied*.—The Interstate Commerce Commission has issued a decision denying the application of this company to issue securities, which decision follows the denial of application for a certificate of public convenience and necessity for the construction of lines in western Texas.

TIONESTA VALLEY.—*Lease of Clarion River*.—The Interstate Commerce Commission has approved a lease by the Tionesta Valley, a subsidiary of the Central Leather Company of the Clarion River which has a line extending from a connection with the Tionesta Valley at Hall-ton, Pa., to Croyland, 12 miles. The Clarion River was leased by the Pittsburg, Shawmut & Northern from 1899 to July 31, 1926, and the latter owned all of its capital stock which it has since sold to the Central Leather Company.

WESTERN MARYLAND.—*Equipment Trust*.—The Interstate Commerce Commission has authorized an issue of \$1,260,000 of equipment trust certificates to be sold at 97.532, the highest bid received by the company.

WESTERN NEW YORK & PENNSYLVANIA.—*Abandonment*.—This company has applied to the Interstate Commerce Commission for authority to abandon that portion of its Kinzua branch from Morrison to Gates, Pa., 8 miles.

Dividends Declared

International Railways of Central America.—Preferred, 1¼ per cent, quarterly, payable February 15 to holders of record January 31.
Mine Hill & Schuylkill Haven.—\$1.25, payable February 1 to holders of record January 14.

Average Price of Stocks and Bonds

	Jan. 18	Last week	Last year
Average price of 20 representative railway stocks.	104.01	102.99	94.48
Average price of 20 representative railway bonds.	98.45	97.73	94.85

Valuation Reports

Final or tentative valuation reports have been issued by the Interstate Commerce Commission finding final values for rate-making purposes, of the property owned and used for common-carrier purposes as of the respective valuation dates, as follows:

Final Reports		
Brooksville	\$85,000	1918
Potato Creek	577,713	1917
Rapid City, Black Hills & Western	900,865	1917
Beaumont Wharf & Terminal	145,800	1916
Atlanta & St. Andrews Bay	1,026,600	1917
Virginia & Truckee	2,197,600	1917
North Louisiana & Gulf	165,000	1918
Chicago & Illinois Midland	2,012,500	1916
Tuscarora Valley	192,310	1917
Susquehanna River & Western	190,832	1917
Tentative Reports		
Arkansas Harbor Terminal	232,900	1919
Kansas City Connecting	1,496,000	1919
Leavenworth Depot & R. R. Co.	100,200	1917
Watertown & Sioux Falls	1,675,000	1919
Tennessee Central	8,790,000	1918
Northwestern Pacific	35,595,000	1916

Railway Officers

Executive

R. J. Bowman has been appointed assistant to the president of the Erie, with headquarters at New York City.

Frank W. Robinson, freight traffic manager of the Union Pacific with headquarters at Omaha, Neb., has been elected vice president in charge of traffic with the same headquarters effective February 1, succeeding **Harry M. Adams**, who will retire on January 31 because of ill health.

M. B. McBride, auditor and assistant treasurer of the Cowlitz, Chehalis & Cascade, with headquarters at Chehalis, Wash., has also been appointed assistant to the president, with supervision of tariffs, rate divisions and such other duties as may be assigned by the president. **Gordon M. Brown**, superintendent and purchasing agent, with headquarters at Chehalis, Wash., has been promoted to assistant to the president, in addition to his duties as purchasing agent.

J. D. Farrell, who has retired as vice-president of the Oregon-Washington Railroad & Navigation Company and the Yakima Valley Transportation Company, after 20 years with the Union Pacific system, was born on July 31, 1856, at Brasher Falls, N. Y. He entered railway service in 1876 on the Chicago & North Western as a laborer in a track-laying gang on lines under construction in Minnesota. Leaving the North Western he entered the employ of the Chicago, Milwaukee & St. Paul as a bridge carpenter, serving later as a material clerk. In 1884 he was appointed assistant superintendent of bridges, buildings and water service on the Western division of the Canadian Pacific. The next year he transferred to the operating department, obtaining experience as brakeman, station agent and passenger conductor on the Canadian Pacific and on the St. Paul, Minneapolis & Manitoba (now a part of the Great Northern). Mr. Farrell was appointed trainmaster on the Chicago, St. Paul & Kansas City (now the Chicago Great Western) in 1888 and in the following year he was promoted to division superintendent. In June, 1892, he became superintendent on the Great Northern, serving successively in that capacity and as assistant general superintendent and general superintendent until 1895 when he left the railroad field to engage in the mining and steamship business. He was president of the Pacific Coast Steamship Company from 1898 to 1903, serving also as general manager for the first four years of the period. From 1903 to 1905 he acted as president of the Northern Steamship Company and as assistant to the president of the Great Northern. The next year he was placed in charge of con-

struction of the Washington Northern (a subsidiary of the Union Pacific) from Portland, Ore., to Seattle, Wash., and in 1910 he was appointed vice-president and general manager of the Second district of the Oregon-Washington, with headquarters at Seattle. On October 1, 1911, he was elected president of the Oregon-Washington, with headquarters at Portland and after the reorganization of the Union Pacific system in 1918 he administered the affairs of the subsidiary company as vice-president, holding this position until his retirement. Mr. Farrell was recently appointed a member of the board of regents of the University of Washington, Seattle.

W. J. Fripp, who has been appointed assistant vice-president of the New York Central Railroad, with headquarters at New York City, was born on August 25, 1863, at Albany, N. Y., and entered railway service on July 17, 1880, and until January 1, 1885, was a yard clerk on the New York Central & Hudson River (now part of the New York Central) at West Albany, N. Y. From the latter date until February 10, 1888,



W. J. Fripp

he was timekeeper on the Mohawk division, and then became clerk on the same division, which position he held until January 23, 1892. He was general dispatcher in the West Albany yard until May 1, 1893, and was then appointed trainmaster of the Mohawk division, which position he held until September 22, 1902. From September 22, 1902, until October 1, 1906, Mr. Fripp was assistant superintendent of the same division, and was then promoted to superintendent of the River division of the same road. He became assistant general superintendent of the Boston & Albany (New York Central system) on February 28, 1907, and on April 15 of the same year was promoted to general superintendent of the same road. Mr. Fripp was appointed general superintendent of the Eastern

district of the New York Central & Hudson River on February 1, 1910, and assistant general manager of the same road on April 15, 1912. On January 1, 1915, he was appointed general manager at New York, which position he was holding at the time of his recent appointment.

William J. Eck, superintendent of the signal and electrical department of the Southern, with headquarters at Washington, D. C., has been appointed assistant to the vice-president in charge of the signal and electrical department, with the same headquarters, and the position of superintendent of the signal and electrical department has been abolished. Mr. Eck was born on July 10, 1876, at Pleasant Plain, Ia., and was



W. J. Eck

graduated from Iowa State College in 1895. He entered railway service in October, 1902, as a draftsman on the Chicago & North Western. From November, 1902, until July, 1907, he was assistant engineer in the signal department of the same road at Chicago, and at the latter time, was appointed electrical engineer of the Southern, in charge of the signal and electrical departments. He was subsequently appointed signal and electrical superintendent of the entire system, which position he was holding at the time of his recent appointment.

Homer E. McGee, general manager of the Missouri-Kansas-Texas, with headquarters at Denison, Tex., has been elected vice-president and general manager, with headquarters at Dallas, Tex., succeeding **William M. Whitenton**, who will resign on February 1, to devote his time to personal affairs. Mr. Whitenton was born September 22, 1867, at Victoria, Tex., and entered railway service in 1884 as a telegraph operator on the Missouri-Kansas-Texas. Later he was promoted to station agent and to train dispatcher and in 1889 he became a train dispatcher on the Southern Pacific at El Paso, Tex., returning to the Katy as a station agent in August, 1890. From January 1, 1891, to December 1, 1896, he was a trick dispatcher on the Texas & Pacific at Marshall, Tex., and until September 1, 1899, chief

dispatcher at that point. He was then appointed chief dispatcher on the Mexican Central at Chihuahua, Mex., and subsequently for two months was night operator at Shawnee, Okla., on the Choctaw, Oklahoma & Gulf, (now part of the Chicago, Rock Island & Pacific). On April 1, 1902, Mr. Whitenton was appointed trainmaster of the Panhandle division of the Rock Island, being advanced to superintendent of that division on October 1, 1903, and transferred to the Arkansas division, with headquarters at Little Rock, Ark., on July 15, 1904. For the next three years he served as superintendent of the Missouri division, with headquarters at Trenton, Mo., and in September, 1907, he was advanced to general superintendent of the Choctaw district, with headquarters at Little Rock. In December, 1909, he was transferred to El Reno, Okla., where he remained until January 1, 1911, when he was promoted to general manager of the Third district and vice-president of the Chicago, Rock Island & Gulf, with headquarters at Ft. Worth, Tex. On February 1, 1912, he was transferred to the First district of the Rock Island, with headquarters at Des Moines, Iowa, being in addition appointed general manager of the St. Paul & Kansas City Short Line (now a part of the Rock Island). During 1914 and 1915, Mr. Whitenton served as operating expert with a special committee on smoke abatement in the Chicago terminals, and in 1916 he was appointed operating assistant on the Texas & Pacific, with headquarters at New Orleans, La. The same year he was appointed general manager of the Trans-Mississippi Terminal at New Orleans, where he remained until January 1, 1917, when he was appointed trainmaster on the Missouri-Kansas-Texas of Texas, at Smithville, Tex. He was then advanced to superintendent of the McAlester district, with headquarters at Muskogee, Okla., and in 1918 he was promoted to assistant to the chief operating officer, with headquarters at Dallas, Tex. His next appointments occurred in the following year when in March, 1919, he was appointed superintendent on the Katy, and in March, 1920, he was promoted to assistant chief operating officer at Dallas. He was elected vice-president in charge of operation, with headquarters at St. Louis in May, 1923, which position he has held until the present time.

George S. Ross, secretary and assistant to the president of the New York, Chicago & St. Louis with headquarters at Cleveland, Ohio, has been appointed assistant to the vice president in charge of traffic in addition to his duties as secretary with the same headquarters and the position of assistant to the president has been abolished. **R. M. Shepherd**, assistant to the senior vice president with headquarters at Toledo, Ohio, has been appointed assistant to the president and will have his future headquarters located at Cleveland, Ohio.

Financial, Legal and Accounting

Karl M. Sisterhenm, assistant to the auditor of the Central of Georgia, has been promoted to assistant treasurer, with headquarters at Savannah, Ga., succeeding **H. V. Jenkins**, who has resigned to become president of the Savannah Morning News.

Roy F. Shields, general attorney of the Oregon-Washington Railroad & Navigation Company, with headquarters at Portland, Ore., has been promoted to assistant general solicitor, with the same headquarters, succeeding **Arthur A. Murphy**, promoted to assistant to the president of the Union Pacific. **William A. Robbins**, attorney on the Oregon-Washington, has been promoted to succeed Mr. Shields.

Richard W. Barrett, general solicitor of the Lehigh Valley, with headquarters at New York City, has been appointed general counsel, with the same headquarters, succeeding **Edgar H. Boles**, who has resigned to become president of the General Reinsurance Corporation. Mr. Barrett was graduated from Earlham College, Richmond, Ind., in 1897. He was professor of Latin for four years and entered the law school of the University of Pennsylvania, and gradu-



R. W. Barrett

ated in 1905. Mr. Barrett practiced law in Philadelphia until his appointment as an assistant in the legal department of the Lehigh Valley in October, 1911. In 1909 Mr. Barrett was elected a police magistrate of the city of Philadelphia, but resigned from this office in the midst of a five-year term in 1911 to enter the service of the Lehigh. He became assistant general solicitor of the Lehigh Valley in February, 1914, and general solicitor in March, 1920, which position he was holding at the time of his recent appointment as general counsel.

Operating

R. P. Jourdan has been appointed assistant trainmaster of the South Florida division of the Seaboard Air Line, with headquarters at Arcadia, Fla.

William White, who has been promoted to terminal superintendent on the Erie, with headquarters at Youngstown, Ohio, succeeding **P. Minehan**, deceased, was born on February 3, 1897, and entered railway service on August 13, 1913, as a clerk in the office of the auditor of freight accounts of the Erie at New York. The same year he was transferred as a stenographer and clerk to the office of the superintendent of the New York, Susquehanna & Western (a subsidiary of the Erie) at Jersey City, N. J., and in March, 1916, he was again transferred to the office of the vice-president at New York. He remained here until December 1, 1916, when he was assigned to the vice-president in charge of operation as his secretary. During federal control he acted as secretary to



William White

the assistant director of the Eastern region, and as secretary of the New York district conference committee and in March, 1920, he was appointed office manager in the operating department of the Ohio region at Youngstown, Ohio. On January 19, 1923, he was promoted to trainmaster on the Kent division, with headquarters at Marion, Ohio, and on March 1, 1924, he was transferred to the Marion division, with headquarters at Huntington, Ind., a position he held until his promotion to terminal superintendent on the Mahoning division at Youngstown, Ohio.

J. A. McNabb, assistant superintendent of the Cowlitz, Chehalis & Cascade, with headquarters at Chehalis, Wash., has been promoted to the position of superintendent.

Franklin Duane, engineer maintenance of way of the Southern division of the Pennsylvania, with headquarters at Wilmington, Del., has been appointed assistant to the general superintendent of the same division in which he held his former position.

Frank W. Grace, superintendent of the Missouri-Kansas-Texas, with headquarters at Muskogee, Okla., has been promoted to general superintendent, with headquarters at Denison, Tex., a newly created position, effective February 1.

Joseph K. Brown, who has been appointed division superintendent of the Adirondack and Ottawa divisions of the New York Central Railroad, with headquarters at Utica, N. Y., was born on January 17, 1875, at Oakland, Ont., and was educated in the public schools of Oakland and for a time attended high school at Branford, Ont. He entered railway service on July 1, 1889, with the Michigan Central as a station helper, and on September 29, 1891, became tele-



J. K. Brown

graph operator for the New York Central at Suspension Bridge, N. Y. He was appointed train dispatcher at Rochester, N. Y., in 1898, and chief dispatcher on February 1, 1908. He became assistant trainmaster at Rochester on September 1, 1909, and was promoted to trainmaster on December 1, 1911. Mr. Brown moved to Buffalo on January 1, 1914, and on May 1, 1924, was appointed assistant superintendent at Buffalo, which position he was holding at the time of his recent appointment as superintendent at Utica.

F. L. Dobson, master mechanic of the Pennsylvania, with headquarters at Meadows, N. J., has been appointed assistant superintendent of the New York division, with headquarters at Jersey City, N. J., succeeding **K. R. Vought**, promoted.

D. D. Flanagan, assistant trainmaster on the Logansport division of the Pennsylvania, has been promoted to trainmaster on the Richmond division with headquarters at Richmond, Ind., succeeding **O. V. Porter**, assigned to special duty in the office of the general manager at Chicago.

C. A. Raymonda has been appointed assistant superintendent of the Syracuse division of the New York Central and the Ottawa & New York, with headquarters at Syracuse, N. Y. **C. H. Weber** has been appointed assistant superintendent of the Buffalo division, with headquarters at Buffalo, N. Y.

Charles E. Olp, who has been appointed superintendent of the Ontario division of the New York Central, with headquarters at Oswego, N. Y., was born on April 5, 1875, at Mt. Morris,

N. Y., and was educated in high school, the Rochester Business Institute and the Rochester Mechanics Institute. He entered railway service on July 28, 1893, with the New York Central, and served as a stenographer in the signal department from 1893 to 1899. He was signal inspector from 1899 to 1901, and chief signalman from 1901 to 1912. Mr. Olp became trainmaster in 1912, which position he held until 1922. At that time he was appointed assistant superintendent, which position he was holding at the time of his recent appointment as superintendent of the Ontario division. Mr. Olp's entire service, until his recent appointment, has been on the former Western, now the Syracuse division of the New York Central.

James H. Johnson, who has been promoted to division superintendent on the Northern Pacific, with headquarters at Missoula, Mont., was born on July 17, 1876, at Lucknow, Ont., and after graduating from high school in 1890 and attending college in 1890 and 1891 he



James H. Johnson

entered railway service in July, 1892, as a telegraph operator on the Canadian Pacific. He was promoted to a dispatcher in 1894 and from 1896 to 1900 he served as a cashier and agent on the Chicago Great Western. His first connection with the Northern Pacific came in May, 1900, when he was appointed a telegrapher. In 1905 he was promoted to a dispatcher on the Yellowstone division at Glendive, Mont., serving from 1907 to 1910 as chief dispatcher at that point and until 1915 as trainmaster at Dickerson, N. D. Mr. Johnson was then transferred to Dilworth, Minn., on the Fargo division being transferred to the St. Paul division, with headquarters at Minneapolis, Minn., in 1916. In 1922 he was promoted to assistant to the general superintendent of the Eastern district at St. Paul, Minn., and from January to April, 1925, he was acting superintendent of the Fargo division at Dilworth. He was then promoted to assistant superintendent, with headquarters at Staples, Minn., a position he held until his further promotion to superintendent at Missoula.

Charles L. Simpson, who has been promoted to superintendent of the Missouri River division of the Minneapolis, St. Paul & Sault Ste. Marie with headquarters at Bismarck, N. D., was born on April 3, 1881, at Neenah, Wis. After attending the Neenah High School he entered railway service on June 30, 1899, as a telegraph operator on the Wisconsin Central (a subsidiary of the Soo), being promoted to train dispatcher in September, 1905. He remained in this capacity until June, 1910, when he was appointed chief clerk to the superintendent of transportation of the Soo. On April 10, 1911, Mr. Simpson was promoted to chief train dispatcher at Fond du Lac, Wis., and on November 7, 1913, he was again promoted to trainmaster on the Chicago division. Ten years later he was promoted to assistant superintendent of the Chicago terminals where he remained until May 1, 1926, when he was transferred to the Minnesota division with headquarters at Harvey, N. D. He held this position until his promotion to superintendent on January 1.

C. L. Nichols, who has retired as general manager of the lines of the Northern Pacific east of Paradise, Mont., with headquarters at St. Paul, Minn., was born at Wyandot, Ill., and entered railway service on the Chicago, Burlington & Quincy. He was later chief dispatcher on the Atchison, Topeka & Santa Fe at Emporia, Kan., trainmaster at Topeka, Kan., and division superintendent with headquarters at Ft. Madison, Iowa. For a short time during 1888 he acted as general superintendent of the Elgin, Joliet & Eastern with headquarters at Joliet, Ill. He then served



C. L. Nichols

successively as a dispatcher on the Chesapeake & Ohio at Huntington, W. Va., dispatcher on the Missouri-Kansas-Texas at Sedalia, Mo., and chief dispatcher on the Chicago, Rock Island & Pacific at Horton, Kan., and at Blue Island, Ill. Mr. Nichols was promoted to division superintendent of the Rock Island with headquarters at Blue Island in 1893 and in 1903 he was transferred to Fairbury, Neb. The following year he was appointed superintendent of the

Chicago, Cincinnati & Louisville (now a part of the Chesapeake & Ohio) with headquarters at Richmond, Ind., later being transferred to Peru, Ind. He was then promoted to general superintendent at Cincinnati, Ohio, and in 1905 he was appointed division superintendent on the Chicago, Great Western with headquarters at Des Moines, Iowa. In 1908 Mr. Nichols began his service with the Northern Pacific as superintendent of the Montana division with headquarters at Livingston, Mont. He was transferred to the Central district in the same year where he remained until 1912 when he was promoted to general superintendent with headquarters at St. Paul. In June, 1919, he became assistant general manager and he was promoted to general manager in December, 1921, a position he held until his retirement.

Traffic

E. B. Finegan, assistant freight traffic manager on the Eastern lines of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has been promoted to freight traffic manager of the entire system, with the same headquarters, succeeding **C. H. Mitchell**, deceased.

G. G. Early, who has been promoted to assistant freight traffic manager of the Wabash, with headquarters at St. Louis, Mo., was born on July 25, 1881, at Pittsburgh, Pa., and entered railway service in 1900 in a clerical capacity on the Erie. He was appointed chief rate



G. G. Early

clerk on the Wabash lines east of Toledo, Ohio, comprising the West Side Belt and the Wabash-Pittsburgh Terminal in 1907 and in 1917 he was promoted to general freight and passenger agent of the Pittsburgh & West Virginia, with headquarters at Pittsburgh, being appointed assistant general freight agent the next year. In 1920, Mr. Early reopened an off-line office of the Wabash at Philadelphia, Pa., and in the following year he was appointed assistant general freight agent, with headquarters at St. Louis. He was promoted to general freight

agent in 1924, with the same headquarters, a position he held until his promotion to assistant freight traffic manager on January 1.

J. Millard Sparling, who has been assistant to the traffic vice-president of the Canadian National, with headquarters at Montreal, Que., has been appointed general freight agent, with headquarters at Boston, Mass. Mr. Sparling will have charge of all freight traffic matters originating in the New England states and on the Portland division of the system. He entered railway service in 1899 as a clerk in the National Despatch Line, and left this company in 1901 to go with the Lehigh Valley. At the end of two years he entered the service of the Central Vermont as a clerk in the freight department at St. Albans, Vt. Two years later he entered the service of the Grand Trunk (now a part of the Canadian National) at Montreal and served that company in various freight



J. M. Sparling

traffic capacities in Portland and New York until May 1, 1914, when he was transferred again to Montreal as chief clerk of the tariff bureau. In 1916, he was appointed chief clerk to the general freight agent at Montreal and in 1918, chief clerk to the freight traffic manager. This latter position he held for about ten months when he became chief clerk to the traffic vice-president, from which position he was promoted to assistant to the traffic vice-president one year later.

Philip F. Harding, who has been promoted to general freight and passenger agent of the Yosemite Valley with headquarters at Merced, Cal., was born on February 13, 1888, at Robinson, Kan., and entered railway service in March, 1903, as a telegraph operator on the Atchison, Topeka & Santa Fe, serving at various points in Oklahoma and Kansas until November, 1904, when he became an agent and telegraph operator on the Chicago & Alton. From April, 1906, to July, 1907, Mr. Harding was an agent and telegraph operator on the Southern Pacific at a number of points in California. He then became an agent and operator on the Spokane, Portland & Seattle, being appointed ticket agent

at Portland, Ore., in May, 1908, and later traveling freight and passenger agent. From June, 1910, to September, 1914, he served as agent on the Western Pacific and he then became a clerk in the general freight department of the



P. F. Harding

Oregon Short Line at Salt Lake City, Utah. In July, 1916, Mr. Harding was appointed chief clerk in the traffic department of the Utah-Idaho Central with headquarters at Ogden, Utah, where he remained until December, 1918, when he was appointed to the district freight traffic committee of the United States Railroad Administration on the Union Pacific at Ogden. He was appointed traveling freight agent on the Chicago & North Western with headquarters at Salt Lake City in September, 1920, and on March 15, 1921, he was appointed traffic manager of the Utah-Idaho Central. In June, 1922, Mr. Harding was appointed general agent on Yosemite Valley which position he held until his promotion to general freight and passenger agent.

Charles J. Sayles, who has been promoted to general freight agent on the Wabash, with headquarters at St.



C. J. Sayles

Louis, Mo., and whose immediate duties will be those of assisting in rate

legislation matters, was born on May 31, 1878, at Mt. Pleasant, Iowa. He entered railway service on May 30, 1899, as a ticket clerk on the Union Pacific at Council Bluffs, Iowa, and on July 1, 1904, was promoted to assistant passenger and ticket agent on the Wabash at Omaha, Neb. On February 1, 1905, he became city passenger agent at Council Bluffs and in the same year he was promoted to city freight and passenger agent at the same place. Mr. Sayles was appointed contracting agent, with headquarters at Omaha, on October 1, 1908, receiving an appointment as commercial agent at Hannibal, Mo., on April 6, 1912. The following year he became chief clerk in the general traffic department at St. Louis, where he remained until March 1, 1920, when he was promoted to assistant general freight agent, with headquarters at the same point. Mr. Sayles remained in this position until his promotion to general freight agent.

Richard A. Belding, who has been promoted to general freight agent on the Wabash, with headquarters at St. Louis, Mo., was born on November 25, 1871, at Springfield, Ill., and after a course in a business college in that city he entered railway service on November 25, 1887, as an office boy in the division freight office of the Chicago, Burlington & Quincy at Burlington, Iowa. He remained with the Burlington in various capacities including that of commercial agent at Des Moines, Iowa, until 1905 when he was appointed general freight and passenger agent of the Des Moines, Iowa Falls & Northern (now a part of the Chicago, Rock Island & Pacific) with headquarters at Des Moines. Later Mr. Belding served as general agent for the Chicago Great



R. A. Belding

Western at Denver, Colo., and at Des Moines, and for a short time he was traffic manager of the Interurban, with headquarters at Des Moines. In 1910 he was appointed assistant general freight agent of the Great Western, with headquarters at New York, where he remained until 1918 when he became traffic manager of the Carolina Ship Building Corporation and the Mutual

Shipping Service at New York. He was appointed traffic manager of the American Short Line Railroad Association in official classification territory in 1921 and in 1924 he resigned to accept a position as industrial agent on the Wabash, with headquarters at Chicago. Mr. Belding was holding this position at the time of his promotion to general freight agent.

Byron J. Torbron, who has been promoted to general freight agent on the New York Central, with headquarters at Chicago, was born near Adrian, Mich., and after finishing the railroad instruction course at the Smith School of Telegraphy, Toledo, Ohio, entered railway service as a telegrapher on the Lake Shore & Michigan Southern (now a part of the New York Central). He served first at Clayton, Mich., and later at Ottawa Lake, Adrian and Jackson. Following a short period in the office of the superintendent at Detroit, Mich., and Hillsdale, he entered the freight traffic department as a clerk in the



B. J. Torbron

office of the general agent at the latter point in 1887. At Hillsdale and Toledo he also held the positions of rate clerk and chief clerk and in 1902 he was promoted to commercial agent at Toledo. In 1910 Mr. Torbron became general agent of the Lake Shore & Michigan Southern, the Lake Erie & Western (now a part of the New York, Chicago & St. Louis) and the Toledo & Ohio Central and the Zanesville & Western (now parts of the New York Central) with headquarters at Pittsburgh, Pa. He was then appointed division freight agent at Youngstown, Ohio, and in 1914 he was transferred to Toledo. In 1917 he was promoted to assistant general freight agent with headquarters at Cleveland, Ohio, in charge of the tariff bureau, being transferred later to commerce and rate matters. During the world war Mr. Torbron served as a member of the advisory committee of the Central Territory Freight Traffic committee at Chicago. On July 1, 1923, he was transferred to Buffalo, N. Y., where he remained until his promotion to general freight agent on January 1,

J. P. Patterson, who has been promoted to assistant freight traffic manager on the New York Central with headquarters at Chicago, entered railway service in July, 1907, as a general clerk on the New York Central at Buffalo, N. Y. In May, 1915, he was promoted to chief clerk in the division freight office at the same point, being transferred to the division freight office at



J. P. Patterson

Erie, Pa., on June 1, 1915. The following year he was again transferred to the office of the assistant freight traffic manager at Chicago, serving then successively as chief clerk to the freight traffic manager and as chief clerk of the consolidated office of the assistant traffic and freight traffic managers. On July 1, 1923, Mr. Patterson was promoted to the division freight agency at Toledo, Ohio, and on August 1, 1925, he was again promoted to assistant to the traffic manager with headquarters at New York, which position he held until his promotion to assistant freight traffic manager at Chicago.

J. E. McGrath, assistant general freight agent of the New York, New Haven & Hartford, with headquarters at Boston, Mass., has been appointed assistant freight traffic manager of the lines East, with the same headquarters, and the position of assistant general freight agent at Boston, has been abolished.

George E. Taylor, coal freight agent of the New York Central and the West Shore, with headquarters at New York City, has been appointed assistant general freight agent, with headquarters at Buffalo, N. Y. **Charles H. Hayes** has been appointed coal freight agent, with headquarters at New York City, succeeding Mr. Taylor.

Rolla R. Mitchell, assistant freight traffic manager of the Union Pacific with headquarters at Omaha, Neb., has been promoted to freight traffic manager with the same headquarters effective February 1, succeeding **Frank W. Robinson**, elected vice president. **L. T. Wilcox**, assistant to the freight traffic manager at Omaha, will succeed Mr. Mitchell.

James W. Graham, traffic manager of the Clover Leaf district of the New York, Chicago & St. Louis with headquarters at Toledo, Ohio, has been promoted to general traffic manager of the Nickel Plate with headquarters at Cleveland, Ohio, succeeding **B. E. Morgan**, promoted to consulting traffic officer with the same headquarters. **J. A. Fitzpatrick**, assistant to the traffic manager, has been promoted to freight traffic manager in charge of solicitation with headquarters at Cleveland. **Edwin Kluever**, general freight agent, has been promoted to freight traffic manager in charge of legislation and tariff matters with headquarters at Cleveland.

Mr. Kluever was born on October 9, 1880, at Cleveland, Ohio, and entered railway service on September 15, 1895, as a messenger in the general freight office of the Nickel Plate, serving successively as stenographer and clerk until May 1, 1907, when he was promoted to chief clerk to the assistant general freight agent at Chicago. On September 14, 1909, he was transferred to the general freight office at Cleveland and on January 1, 1917, he was promoted to assistant general freight agent, with the same headquarters. Mr. Kluever was promoted to general freight agent, with headquarters at Cleveland on March 1, 1920, a position he held until his further promotion to freight traffic manager, with jurisdiction over legislation and tariff matters.

Mechanical

F. Kerby, supervisor of locomotive operation of the Baltimore & Ohio, with headquarters at Cumberland, Md., has been appointed assistant to the chief of motive power and equipment with headquarters at Baltimore, Md. He was born July 23, 1864, at St. Clairsville,



F. Kerby

Pa., and has been in the continuous service of the Baltimore & Ohio since 1903, starting as locomotive engineman on the Cumberland division. For the next ten years he was engineman or air brake inspector on the Connellsville, Philadelphia and Chicago divisions, being promoted to supervisor of locomotive operation on the staff of the

general manager of the Eastern lines in 1913. In 1916, he was promoted to a similar position on the staff of the vice-president in charge of operation, from which he has now been advanced to assistant to the chief of motive power and equipment.

J. R. Agnew has been appointed road foreman of engines of the Washington division of the Southern, with headquarters at Alexandria, Va.

R. H. Flinn, master mechanic on the Western region of the Pennsylvania, with headquarters at Columbus, Ohio, has been promoted to superintendent of motive power of the Northern division, Central region, with headquarters at Buffalo, N. Y.

W. H. Flynn, general superintendent of motive power of the New York Central lines East and West of Buffalo, with headquarters at New York City, has been appointed general superintendent of motive power and rolling stock, with the same headquarters.

Engineering, Maintenance of Way and Signaling

Raymond Swenck, division engineer of the Pennsylvania, with headquarters at Pittsburgh, Pa., has been appointed engineer maintenance of way of the Southern division, with headquarters at Wilmington, Del., succeeding **F. Duane**, promoted.

R. J. Cullen, assistant engineer in the signal department of the Boston & Albany, has been appointed signal engineer, with headquarters at Boston, Mass., succeeding **G. A. Kirley**, promoted. **C. B. Carter**, assistant general foreman, has been appointed assistant engineer in the signal department, succeeding Mr. Cullen.

R. W. E. Bowler, division engineer of the Toledo division, Western region, of the Pennsylvania, with headquarters at Toledo, Ohio, has been transferred to the Pittsburgh division, Central region, with headquarters at Pittsburgh, Pa. **F. M. Hawthorne**, acting division engineer at Terre Haute, Ind., has been promoted to division engineer of the Cleveland and Pittsburgh division, Central region, with headquarters at Cleveland, Ohio. **L. B. Young**, assistant division engineer, with headquarters at Columbus, Ohio, has been promoted to division engineer of the Monongahela division, Central region, with headquarters at Uniontown, Pa.

A. A. Matthews, who has been appointed chief engineer of the Denver & Salt Lake, with headquarters at Denver, Colo., was born at Tremont, Ill., on November 9, 1876, attended the public schools of Colorado Springs, Colo., and was graduated from the Colorado School of Mines, Golden, Colo. He entered railway service in July, 1896, as a chainman on the Union Pacific, and in July, 1899, he was appointed a level-

man on the Colorado & Southern, serving on preliminary and location surveys. From December, 1899, to March, 1901, Mr. Matthews acted as an instrument man on the El Paso & Northeastern (a subsidiary of the Southern Pacific) on preliminary location north of Alamogordo, N. M., and he was then engaged for five months in mine surveys and examinations in southern Oregon and northern California. In the same year he was appointed principal assistant engineer of the Colorado & Southern, with headquarters at Denver, devoting his time to general maintenance work and the location and construction of various extensions and branches. In June, 1907, he was appointed engineer of construction in charge of the location and construction of the Caliente & Pische (now a part of the Los Angeles & Salt Lake), returning to the C. & S. as assistant engineer on maintenance work in the



A. A. Matthews

following year. From July, 1911, to November, 1912, Mr. Matthews was assistant general manager of the Texas Central (now operated as a part of the Missouri-Kansas-Texas), with headquarters at Waco, Tex., and he then became superintendent on the Missouri, Kansas & Texas of Texas at the same point. In January, 1915, he was promoted to engineer of maintenance of way, with headquarters at Dallas, Tex., being transferred to the Missouri, Kansas & Texas lines, with headquarters at Parsons, Kan., in April, 1917. In the following year he was appointed chief engineer of the St. Louis Southwestern, serving from August, 1918, to March, 1919, as assistant chief engineer of a group of railroads under the federal manager at Dallas. At the end of federal control he returned to the St. Louis Southwestern as chief engineer, where he remained until May, 1921, when he was appointed secretary and general manager of the Western Concrete Products Company at Denver, a position he held until his appointment as chief engineer of the Denver & Salt Lake.

B. W. Molis, who has been appointed signal engineer of the Denver & Rio Grande Western with headquarters at

Denver, Colo., was born on September 10, 1893, at Muscatine, Iowa, and entered railway service on May 1, 1911, at that point as a helper in the signal department of the Chicago, Rock Island & Pacific. He served in this department on the Missouri, Illinois, Iowa and Chicago Terminal divisions as an assistant signal maintainer during 1911 and 1912, as a signal wireman during 1913 and as a signal maintainer until 1917, when he was promoted to construction foreman on the Iowa division. On November 1, 1919, he became a signal maintenance foreman on the Iowa division and on May 1, 1920, he was advanced to office engineer in the district signal engineer's office at Des Moines, Iowa. Mr. Molis was promoted to assistant signal supervisor on August 7, 1921, returning to Des Moines as a draftsman in the same year and being transferred to the general signal office at Chicago on train control engineering in 1922. He was again transferred to Des Moines in 1923 and on September 1, 1925, he was promoted to engineer in charge of construction of signals on the Chicago Terminal division. Upon the completion of this project on March 1, 1926, he was appointed office engineer in the district signal engineer's office at Des Moines, which position he held until his resignation on December 19, 1926, to become signal engineer of the D. & R. G. W.

Purchases and Stores

Walter E. Evans, assistant to the general purchasing agent of the Canadian National, with headquarters at Montreal, Que., has been promoted to purchasing agent of the Grand Trunk Western system, with headquarters at Detroit, Mich., succeeding **George W. Caye**, retired under the pension rules of the company. Mr. Caye, who was born on December 1, 1865, at Malone, N. Y., entered railway service on August 1, 1882, as a junior clerk in the passenger department of the Central Vermont (now a part of the Canadian National). From 1885 to 1896 he served as a stenographer and chief ticket clerk and in 1897 he was appointed chief clerk to the general superintendent. For the next two years he acted as traveling car agent on the Canada Atlantic (now a part of the Canadian National) and in 1902 he was appointed secretary to the general manager. In 1905 he became chief clerk to the vice-president and general manager of the Grand Trunk Pacific (now a part of the Canadian National) where he remained until 1907 when he was promoted to assistant to the vice-president and general manager, and purchasing agent, with headquarters at Winnipeg, Man. In 1916 he was promoted to general purchasing agent of the Grand Trunk and the Montreal & Southern Counties, with headquarters at Montreal, being also appointed purchasing agent of the Chicago, New York & Boston Refrigerator Company in 1919. Mr. Caye remained in this position until 1923 when

he was appointed purchasing agent of the Central region of the Canadian National, with the same headquarters. He was transferred to Detroit in charge of the purchasing department of the Grand Trunk Western lines of the Canadian National in April, 1924, a position he held until his retirement on January 1, after more than 44 years in the service of this company and its subsidiaries.

Obituary

Ira S. Downing, general master car builder of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Indianapolis, Ind., died on January 15, at Indianapolis.

R. L. Calkins, freight claim agent of the New York Central Railroad, died at his home in Bronxville, N. Y., on December 27, four days before he would have retired, having reached the age limit of 70 years.

Robert B. Hubbell, for about 15 years purchasing agent at New York for the International Railways of Central America, died on January 13 at Kingston, Jamaica, at the age of about 84 years. Previous to his service with the International Railways Mr. Hubbell had served as purchasing agent of the United Fruit Line.

Henry Knowles, superintendent of car service of the Chicago, Terre Haute & South Eastern, from 1918 to 1921, died at Chicago on January 15. Mr. Knowles was assistant car service agent on the Chicago, Rock Island & Pacific at Chicago from 1901 to 1904, car accountant on the Southern Indiana from 1904 to 1911, and car accountant on the Chicago, Terre Haute & South Eastern from 1911 to 1918, and more recently was in the real estate business in Chicago.

John D. McArthur, president of the Edmonton, Dunvegan & British Columbia, from 1916 to 1920, died on January 10 on his special car at Winnipeg, Man. He was born on June 25, 1854, at Lancaster, Ont., and during the greater part of his life was a railroad contractor. He obtained the contract for the construction of the line of the Grand Trunk Pacific between Winnipeg and Thunder Bay and was largely responsible for the construction of the Edmonton, Dunvegan & British Columbia in 1915. At the time of his death Mr. McArthur was president of a group of lumber and paper companies in Manitoba.

David Rowland Francis, chairman of the board of directors of the Missouri & North Arkansas from 1906 to 1915, died at his home in St. Louis, Mo., on January 15. Mr. Francis, who was born in Richmond, Ky., on October 1, 1850, and was graduated from Washington University, St. Louis, in 1870, was elected mayor of St. Louis in 1885, governor of Missouri in 1889 and was appointed Secretary of the Interior in President Cleveland's cabinet in 1896.

In March, 1906, he was elected chairman of the board of directors of the Missouri & North Arkansas, a position he held until his appointment as ambassador to Russia in March, 1916. Since his retirement as ambassador to Russia in March, 1921, Mr. Francis has virtually withdrawn from active life.

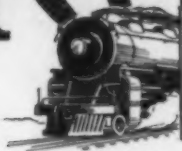
Ernest Ocaranza Llano, general director of the National of Mexico who retired from active service in 1925, died of pleurisy on January 12 in his private car at the Union station, St. Louis, Mo., while en route to John Hopkins hospital, Baltimore, Md., for treatment. Mr. Llano was born on October 28, 1880, at Ahualulco, Jalisco, Mex., and entered railway service at the age of 18 as a telegraph operator on the Mexican Central (now a part of the National of Mexico). After a short period as a telegraph operator on the Mexican National, he entered the employ of the Chihuahua & Pacific (merged as the Mexico North Western) in the same capacity in 1900 and was advanced to station agent, to train dispatcher, and then to chief clerk to the superintendent. In November, 1905, he was appointed chief dispatcher on the Nacozari, with headquarters at Nacozari, Sonora, and in 1907 he was promoted to trainmaster and acting superintendent. In August, 1912, he was promoted to superintendent and in July, 1921, he was appointed general manager of the National of Mexico, with headquarters at Mexico City, Mex. In 1923 Mr. Llano was elected general director which position he held until his retirement in 1925.

Samuel T. McLaughlin, assistant to the freight traffic manager of the Baltimore & Ohio, Southwest district, with headquarters at Cincinnati, O., died on December 29, 1926. Mr. McLaughlin was born on May 31, 1850, at Cincinnati. He was educated in the public and high schools of Cincinnati, and entered railway service in November, 1864, in the office of the Star Union Line, remaining with that line until August, 1873. He then became chief clerk to the general manager of the Continental Line, at Cincinnati, in which position he remained until February 1, 1884. At that time he entered the service of the Globe Fast Freight Line at Buffalo, as general manager, and remained with that line until December, 1886. Mr. McLaughlin then returned to Cincinnati as general manager of the Continental Line. On March 1, 1896, he became general freight agent of the Baltimore & Ohio Southwestern (now part of the Baltimore & Ohio), at Cincinnati, and had his jurisdiction extended over the Cincinnati, Hamilton & Dayton lines (part of the Baltimore & Ohio) on April 1, 1911. On October 21, 1916, he was promoted to assistant freight traffic manager of the Baltimore & Ohio, Southwest district, and on March 1, 1920, was appointed assistant to the freight traffic manager of the Southwest district, at Cincinnati, O., which position he was holding at the time of his death.



Two Sections—Section Two

Railway Age



Motor Transport Section

*Devoted to the
Co-ordination of Railway and Highway Service*



FIRST HALF OF 1927—No. 4

NEW YORK—JANUARY 12, 1927—CHICAGO

SEVENTY-SECOND YEAR



accf

Hall-Scott



See
Pages 67, 68, 69, 70
This Issue



The residential limited

Back from the tracks lies virgin territory as far as railroad invasion is concerned—and consciously so. The inhabitants of these semi-rural sections seek not the inconvenience, but the quietude, although inconvenience is theirs. The ordinary public conveyance is, through its disturbing element, most unwelcome.

Many railroads are today following the modern trend by moving inoffensively into the suburbs, meeting their patrons and selling their service with luxuriously appointed coaches.

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WESTINGHOUSE AUTOMOTIVE AIR BRAKES

A-6163



Railway Age

Motor Transport Section
Devoted to the
Coordination of Railway and Highway Service

Vol. 82 January 22, 1927 No. 4



Co-ordinated Transportation on the Boston & Maine

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PERFORMAN

Railway Age

Motor Transport Section

Devoted to the
Co-ordination of Railway and Highway Service

Vol. 82, No. 4

January 22, 1927

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Page 61, of Advertising Section

A Year of Rapid Growth

MOST encouraging progress was made in the field of bus and truck operation by the railways in 1926. A year ago there were only nine Class I railways operating buses. At the present time railway service is being supplemented by bus service on 23 lines, and the number of buses in operation has increased from 225 buses a year ago to the present total of 680 buses. It is impossible to be quite so definite as to the actual amount of the increase in the use of motor trucks by the railways in 1926, but it is thought that a conservative estimate of the increase in the number of motor trucks operated in the service of the railways during 1926 would place it at approximately 100 per cent. A number of roads which were not operating trucks for freight haulage a year ago are now doing so, and it is significant that the tendency is for the railways to own the trucks that they operate, rather than to contract for them. Briefly, the number of roads operating buses has more than doubled during the past year, the number of buses operated has nearly trebled, the number of roads operating trucks has increased substantially and the number of trucks operated has about doubled. This is in itself an unusual record, but present indications are that 1927 will see developments of even greater magnitude.

The Bus or Rail Motor Car, Which?

THE bus and the rail motor car should not be competitors. Each has its proper field in railroad service and if either is adopted generally to the exclusion of the other under many varying conditions, then it is pretty safe to assume that uneconomic operation will be the outcome. Each type of vehicle has a number of advantages not possessed by the other. To mention a few which favor the bus: It reaches more nearly the places where people want to go; it is generally much cheaper in initial cost and in operating charges; it tends to build new traffic rather than only to handle existing traffic more cheaply. On the other hand, where much baggage, express and mail traffic is involved the rail motor car offers advantages which the bus does not. Moreover, a railroad can place the rail motor car in service without setting up a new organization to operate it or going through the long process of securing permits from local and state authorities. It mans the rail cars with regular railway employees, obviating the sometimes painful necessity of dispensing with the services of faithful employees. Patently there are advantages and disadvantages in both types of vehicle which make it utterly impossible to generalize about either and to say that one, to the exclusion of the other, can solve the local passenger problem for all the railroads. This being true, it is essential that railroads

seeking a solution of problems of this character approach the study of the two types of vehicle with scientific cold-bloodedness, seeking to make sure that the action they take will be that which the figures will in the end justify.

Union Pacific Extends Bus Lines

THE Union Pacific, through its subsidiary the Oregon-Washington Railroad & Navigation Company, which for some months has been operating a bus line between Walla Walla, Wash., and Pendleton, Ore., has just announced plans for the installation of two additional bus lines of considerably greater length in the same vicinity. One of these will extend from Walla Walla to Yakima, a distance of approximately 125 miles, and the other will parallel the Columbia river between Portland, Ore., and Pendleton. Thus the Walla Walla-Pendleton line, which is less than fifty miles long, is to become the nucleus of a 400-mile system of bus lines. Presumably the Oregon-Washington Company and the Union Pacific have been favorably impressed by the performance of their experimental bus line; otherwise their present plans would not have been put in process of execution. It is known that the Union Pacific has in contemplation the installation of bus service at a considerable number of points on its system. If it continues to press forward with its bus operations it may soon be the largest rail operator of buses. It is already among the leaders, with its 39 buses in tour service in southern Utah and the equipment of its Walla Walla-Pendleton line.

Why Describe the Big California Bus Systems?

IN the Motor Transport Section of November 27, a description of the bus system of the California Transit Company and its operating methods were published. In the issue of December 25, the operations of the Motor Transit Company of Los Angeles, Cal., were given a considerable amount of space. In this issue an article is devoted to the operations of the Pickwick Stages System, which centers in California and is the most extensive bus system in the world. In the Motor Transport Section of February 26, another California bus system will be described. There may be questions in the minds of some as to just why the Motor Transport Section of the *Railway Age* should devote so much space to the operations of independent, competitive companies, all located on the west coast. Several purposes have been in mind. In the first place, the Railroad Motor Transport Conference is to meet in San Francisco, Cal., some time in April. Prior to

that time studies of the four principal western bus lines will have been made available, through publication in the Motor Transport Section, to the considerable number of railway officers who will attend the conference. In the second place, California may well be considered the birth place of bus transportation. The process of the development of bus lines in that state has been going on for a long time, and the methods which they have now adopted reflect their long experience. They are therefore worth the study of those who are entering or considering entering the bus transportation field. It will be a valuable experience for railway officers interested in bus operation who go to California to spend some time studying the methods of the veterans there. It is hoped that the four articles on California bus operations in the Motor Transport Section will facilitate such studies, as well as make available most of the information that such studies would develop to those who cannot see what is described for themselves.

A. E. R. A. Bus Accounting Classifications Widely Used

IN a letter to the editor (page 346), M. W. Glover, chairman of the Committee on Bus Accounting of the American Electric Railway Accountants' Association, calls attention to the fact that the uniform accounting classifications for bus companies which were published in the Motor Transport Section of November 27, and commented on editorially in the same issue, were designed primarily for the use of bus operating subsidiaries of railways rather than independent operators, as was stated in our editorial. These classifications, which were approved by the National Association of Railway and Utilities Commissioners, were originally prepared by the committee of which Mr. Glover is chairman. Being in two forms, one for larger companies and the other for smaller companies, these classifications are capable of general use by any bus company regardless of its ownership. As Mr. Glover states, these classifications have been adopted by several hundred companies. Their general use is recommended.

Finding the Costs and Earnings of Individual Trains

THERE ought to be some more definite standards for measuring the costs and revenues of specific trains—standards the fairness of which will be everywhere recognized. The question comes up particularly in the case of branch line local passenger or mixed trains. Railroads seeking authority to substitute buses for some of these trains have more than once had their testimony questioned. How did they arrive at their cost figures? How allocate their revenues, particularly from "head-end" traffic? How much would it cost to operate a rail motor car? It cannot be hoped that a universally applicable figure for train cost, rail motor car cost or bus cost can be arrived at. However, it is methods of making estimates rather than the actual figures themselves which need to be standardized. Here is a worthy task for the Railroad Motor Transport Conference and it would be hard to find one of greater immediate importance. It is a task calling for men from almost all railroad departments and the conference, combining in its membership

as it does men from varied branches of railroad work, is well fitted to undertake it. It would be of real assistance to the railroads in presenting a case, either to the authorities or the public, if they could announce that in arriving at their conclusions they had followed a procedure recognized generally as scientific and fair. Likewise, it would be a help to the railroads within their own organizations to have the assistance of expert opinion from the outside in determining methods of computation. If one railroad has arrived at a figure of \$1.25 a mile as the cost of operating branch line steam trains and another, under similar operating conditions, is using a figure of 75 cents per mile, there is evidently a sufficiently large discrepancy in method to warrant a serious attempt to get together.

The I. C. C. Motor Transport Report

THE Interstate Commerce Commission's statistical summary of answers made by Class I railways to its questionnaire regarding motor bus and motor truck operations, like many other such reports on subjects of magnitude which require corresponding amounts of time for completion, was out of date almost before it was issued, so extensive and rapid have been the developments in motor transport among the railways during the last six months. On the other hand, the commission's summary is valuable as a picture of the status of railroad motor transport in the middle of 1926. The commission's summary lists 13 Class I roads as operators of motor buses, but there are now almost twice that many. The summary also places the number of buses operated by Class I railways at 505, but later figures show that this total is now approaching 700.

The part of the report dealing with motor trucks is not quite clear. This places the number of motor trucks owned by Class I railways at 55, stating that no motor trucks are owned by subsidiaries. With respect to the number of motor trucks operated by Class I railways in all regions, the report gives the following information: In terminal service, the number of trucks operated by railways is 21, by subsidiaries, 14; in line service, the number of trucks operated by railways is 5, by subsidiaries, 41. It is known that many more trucks are actually in the service of the steam railways through contracts of the carriers with independent trucking concerns. The number of such trucks may be included in the commission's classification of trucks used "in connection with respondent's operations" and operated "by motor transport companies or individuals," but this is not clear.

The reports of the number of buses and trucks operated by independent concerns are interesting. These disclose that the number of buses operated by such independents is nearly 22,000 and the number of trucks is approximately 45,000. These figures are admittedly incomplete, but they make a rather imposing total.

The action of the commission in publishing the summary of the replies to its questionnaire and, furthermore, doing it with comparative promptness, is commendable. In spite of its deficiencies, due to conditions over which the commission had no control, the report presents a reasonably accurate picture of railroad motor transport in the middle of 1926 and as such is worth the close study of everyone.

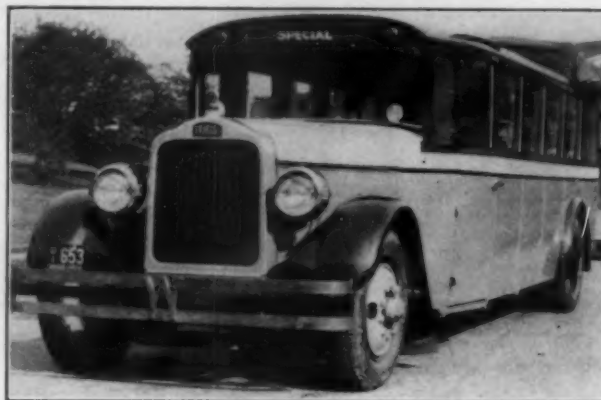
I. C. C. Reports on Motor Transport

Statistical summary of answers of Class I railways to bus and truck questionnaire are made public

TWO hundred twenty-five motor buses owned by Class I steam railways; 505 motor buses operated in terminal and line service by Class I steam railways; 21,863 motor buses operated by motor transport companies and individuals; 55 trucks owned by Class I railways; 81 motor trucks operated by Class I railways and their subsidiaries; and 45,336 motor trucks operated by motor transport companies and individuals are the high points of the statistical summary of answers made by Class I railways to its questionnaire in Docket No. 18,300, motor bus and motor truck operation, which has been made public by the Interstate Commerce Commission.

This motor transport investigation was the first effort made by the commission to collect information concerning this comparatively new factor in the nation's transportation system. The replies to its questionnaire were more or less incomplete owing to the inability of some railways to obtain information in detail. This was especially true with respect to the number of motor vehicles owned and operated by motor transport companies and individuals and the route mileage covered by their operations, which in some cases probably contains slight duplications. Of the 176 Class I line haul railways in the United States, answers were received from 164, including all the larger railways, in time for inclusion in the summary.

Nearly all of the buses operated by steam railways are operated through subsidiaries. In fact, only eight buses are operated by the railways themselves in terminal and line service while 497 are operated in line service by subsidiaries. Table I shows the number of buses operated



The New England region reports a total of 179 buses operated by Class I railways, leads all but one of the other regions of the United States in this respect. In this region the Boston & Maine with 56 buses covers a route mileage of 610, the Maine Central with 5 buses covers a route mileage of 75, and the New York, New Haven & Hartford with 118 buses covers a route mileage of 1042.

The New York Central is the only road in the Great Lakes region which is operating buses, this company having 81, which cover 337 miles of route.

In the Southern region the Nashville, Chattanooga & St. Louis, with 3 buses covers a 27-mile route and the Norfolk Southern with an equal number covers 22 miles of route.

Slightly ahead of the New England region in point of scope of railroad bus operation is the Northwestern region, where the Great Northern and the Spokane, Portland & Seattle have large fleets of buses. The Great Northern is credited with 157 buses which cover a total route mileage of 7,350 miles, and the Spokane, Portland & Seattle with 25 buses operates over 289 miles of route.

Three railways in the Central Western region are operators of buses. The Colorado & Southern with 14 buses operates over 154 miles of route, the Denver & Rio Grande Western with 13 buses operates over 350 miles of route, and the Union Pacific with 39 buses operates over 154 miles of route.

Independent Bus Operation

The reports of the railways on the number of buses operated by motor transport companies and individuals and their route mileages compose a picture of the extent of bus competition. Some of these are "in connection with" railways, but most are "in competition with" them. In the New England region 474 buses, with an aggregate bus route mileage of 8,683 miles, were reported by the railways. In the Great Lakes region a total of 3,864 buses were reported, these operating over 40,687 miles of route.

Railways in the Central Eastern region reported operations by independents of 5,662 buses over 38,639 miles of route. In the Pocahontas region there are 798 buses

TABLE I—MOTOR BUSES OPERATED—ALL REGIONS

Operated by	Number Operated			Total
	Interstate	Intrastate	Common	
<i>In Terminal Service</i>				
Respondents		3		3
Subsidiaries				
Motor transport companies and individuals		1,459	52	1,511
Total		1,462	52	1,514
<i>In Line Service</i>				
Respondents	1	3	1	5
Subsidiaries	21	264	212	497
Motor transport companies and individuals	2,848	14,193	3,311	20,352
Total	2,870	14,460	3,524	20,854
<i>Bus Route Mileage</i>				
	Miles	Miles	Miles	Miles
Respondents	46	4	7	57
Subsidiaries	387	2,569	3,825	6,781
Motor transport companies and individuals	88,579	196,254	61,129	345,962
Total	89,012	198,827	64,961	352,800

by the railways, their subsidiaries and by motor transport companies and individuals in the various types of service. The word "common" as used in this compilation means that the figures reported were not separated as between interstate and intrastate.

The eight buses owned by railways themselves, include one owned by the Chicago, Milwaukee & St. Paul, six owned by the Southern Pacific and one owned by the Union Pacific.

operating over 11,629 miles of route. In the Southern region 2,236 buses operate over 45,065 miles of route, according to the reporting companies.

Reports of railways in the Northwestern region show a total of 3,058 buses in operation, with total bus route mileages of 58,180 miles.

In the Central Western region 4,488 buses were reported, these operating over routes aggregating 111,658 miles in length. In the Southwestern region 1,283 buses were reported, these operating over routes 31,421 miles long.

Truck Operations

The summary of the Interstate Commerce Commission does not present a true picture of the use to which the railways are putting the motor truck in freight haulage, on account of the fact that no reference is made to their use of trucks under contracts with independent trucking concerns. The commission report shows 55 motor trucks owned by Class I railways, and truck operations as follows: 21 trucks operated by railways themselves in terminal service and 14 trucks operated by subsidiaries in terminal service; 5 trucks operated by

TABLE II—MOTOR TRUCKS OPERATED—ALL REGIONS
Number operated

Operated by	Interstate	Intrastate	Common	Total
<i>In Terminal Service</i>				
Respondents		21	.....	21
Subsidiaries		14	.....	14
Motor transport companies and individuals	163	1,446	301	1,904
Total	163	1,475	301	1,939
<i>In Line Service</i>				
Respondents		2	.....	5
Subsidiaries		41	.....	41
Motor transport companies and individuals	9,216	22,266	11,950	43,432
Total	9,218	22,310	11,950	43,478
<i>Truck Route Mileage</i>				
	Miles	Miles	Miles	Miles
Respondents	28	101	.....	139
Subsidiaries		527	.....	527
Motor transport companies and individuals	172,943	333,052	105,260	611,255
Total	172,981	333,680	105,260	611,921

railways in line service over 139 route miles and 41 trucks operated by subsidiaries in line service over 527 route miles.

In terminal service motor transport companies and individuals operate 1,904 trucks. In line service they operate 43,432 trucks over 611,255 miles of route.

No railways in the Pocahontas, Southern, Northwestern, Central Western and Southwestern regions are engaged in the operation of motor trucks in terminal or line service, according to the commission's summary. In the New England region the New York, New Haven & Hartford operates one motor truck in terminal service and in the Great Lakes region the Detroit & Mackinac and the Lehigh Valley operate one truck each in line service. In the Central Eastern region the Baltimore & Ohio operates 20 trucks in terminal service and 2 in line service.

Few Subsidiary Truck Operations

There are few instances of operation of motor trucks by subsidiaries of the railways. There are none at all in the Central Eastern, Pocahontas, Northwestern and Southwestern regions. In the New England region the Boston & Maine, through a subsidiary, operates 26 trucks over 124 miles of route and the Maine Central operates

7 trucks over 103 miles of route. In the Great Lakes region the New York Central, with 10 trucks, covers 158 miles of truck routes. In the Southern region the Nashville, Chattanooga & St. Louis operates 2 trucks, through a subsidiary, over a route 27 miles long. In the Central Western region the Denver & Rio Grande Western, through a subsidiary, has 10 trucks operating over routes aggregating 115 miles in length.

Independent Truck Operations Widespread

The reports of the Class I railways in each region give evidence of operation of motor trucks by motor transport companies and individuals in all parts of the United States. In New England 3,393 such trucks were reported, with truck route mileages of 84,352 miles. In the Great Lakes region Class I railways reported 7,970 trucks operating over routes aggregating 103,254 miles in length. In the Central Eastern region the railways reported 13,810 trucks operating over 113,695 miles of routes.

In the Pocahontas region there are 349 trucks with aggregate route mileages of 5,287 miles. A total of 2,321 trucks were reported in the Southern region, these having 46,978 miles of routes. In the Northwestern region 3,982 trucks were reported with 63,569 miles of routes. In the Central Western region 10,386 trucks were reported, these operating over 126,805 miles of routes.

Railways in the Southwestern region reported 3,125 trucks operating over routes aggregating 67,315 miles in length.

Bus Regulation Bill

Before Congress

A BILL providing for the regulation of motor buses engaged in interstate commerce has been introduced in Congress by Congressman Denison of Illinois. It is known as House of Representatives Bill 15606. It is almost identical with a draft of a bill presented by S. A. Markel on behalf of the Motor Bus division of the American Automobile Association at the hearings in Washington, D. C., before the Interstate Commerce Commission in its investigation into motor bus and motor truck operation.

The bill provides for regulation of buses operating over regular routes and also for buses not operating over regular routes. It provides that certificates be obtained from the regulatory bodies of the various states in which service is contemplated before operation can begin. Bus lines in operation at the time the law became effective would be required to file similar applications, the fact that they were already in operation not being considered ipso facto evidence that a certificate should be granted them.

Liability bonds or insurance in amounts fixed by the states would be required. The bill also requires that rates be reasonable and provides for 30-day notices of changes in rates, giving the commissions authority to fix rates if complaint against existing rates is made.

A uniform system of accounts to be used by all motor carriers would be prepared by the Interstate Commerce Commission and operating companies would be required to conform to it.

Provision is made for the settlement of differences between the orders of any two or more states by joint boards with last resort appeal to the Interstate Commerce Commission where necessary.



The Buffet-Parlor

Looking Over the Biggest Bus System

Pickwick Stages have won success with extraordinary services rendered

THE Pickwick Stages System operates nearly 5,000 route miles of motor stages which reach 1,500 cities and towns between El Paso, Tex., on the east and Portland, Ore., on the north, with intermediate terminals at San Diego, Cal., Los Angeles, and San Francisco, while at Portland connections are made

increasing from 51,000,000 to 98,000,000. To handle this traffic, 300 motor stages are in regular daily operation and these make a monthly average of 1,500,000 car miles.

One of the features of the Pickwick operation is a limited service between Los Angeles and San Francisco in which buffet parlor cars equipped with toilet and dining facilities are used. These parlor cars are scheduled in both directions daily, except Sunday, and make the runs between San Francisco and Los Angeles in 15 hours including six stops enroute. This is two hours less than the average time between these points and most of the difference is due to the smaller number of stops and the elimination of the stops for meals.

The Pickwick System has no strictly suburban lines, except at Los Angeles and San Diego, and comparatively few branch lines. Suburban stages are run in the morning and evening hours and at night over the through routes at a number of points where this service is demanded and, ordinarily, these cars are filled to capacity. In general, however, the company depends on long haul business and local traffic along the through routes, as is indicated by the average journey per passenger of 49 miles.

An interesting feature of the stage travel is that many passengers go through the intermediate terminals to destination without stopovers. Instances have been known where passengers between Portland and San Diego have made the entire trip, 63 hours, without a break, except that necessary to change stages at the Oregon-California line, at San Francisco, and at Los Angeles. Another interesting fact is that the night stages are more popular than those run on daylight



Pickwick Bus Station and Hotel at San Diego

for Seattle, Wash., and Vancouver, B. C. In 1925, slightly more than 1,500,000 passengers were carried and in 1926, this was increased to 2,000,000, while the increase in five years has been 1310 per cent. The average journey per passenger increased from 34 miles in 1925 to 49 miles in 1926, resulting in passenger miles

schedules. It is frequently necessary to run more than one car on night schedules to handle the number of passengers calling for accommodations, and cases are on record where as many as seven stages were required to protect the 1:00 a.m. runs between San Diego and Los Angeles. The runs from 9:00 p.m. to midnight between these points, however, handle only a small number of passengers while all the other runs are crowded. One reason for this is that the run is made in about five hours, and the earlier runs bring the passengers to destination at an inconvenient hour of the early morning.

The Pickwick System does not extend north of Portland but makes connection at Portland for Seattle and Vancouver. The company operating north out of Portland refused for a long time to put on night stages and the passengers coming in from the south were compelled to stop over night and continue their journey the next day. Recently, however, a night schedule to connect with the Pickwick stages was put on as an experiment and it proved to be so popular that several more were added and all are running to capacity.

Tourist Travel Is Light

While tourists account for only a small part of the traffic, except between Los Angeles and San Diego, quite a number of eastern passengers holding through rail tickets check their baggage on the railroad and ride the stages one way between Los Angeles and San Francisco. An analysis of the traffic indicated, however, that the tourist business is nearly negligible, except as mentioned between Los Angeles and San Diego, and that during the season when the largest number of tourists visit the coast, the stage traffic on the remainder of the system is smaller than at other seasons. This analysis indicated also that much of the through travel is repeater traffic, that is, it is from regular patrons. Recently, one of the Los Angeles-San Francisco stages was delayed by a broken axle until a relief car could be brought up. One of the passengers on this stage made a vigorous complaint, saying it was her thirty-first trip by stage between these cities, and this was the first time any stage she had ridden had been off schedule more than a few minutes.

A Route More Than 1,000 Miles Long

The route between Los Angeles and El Paso, 1,003 miles, passes through Banning, El Centro, and Yuma. The stages on this line handle practically no passengers who go the entire distance between these terminals, but the travel between intermediate points is heavy, and most of the stages are filled to capacity on every run. On July 1, 1926, the United Stages, with lines from Riverside, Cal., to Ehrenberg, Ariz., and from Coachella to El Centro, together with a short branch from Brawley to Niland, was purchased and consolidated with the Pickwick system. This consolidation gives alternate routes between Los Angeles and Phoenix, as this company already had a line from Ehrenberg to Phoenix. The new route to Phoenix will be a little more than 100 miles shorter than the present route through Banning, El Centro, and Yuma, and it is expected that the through stages between Los Angeles and El Paso will use this route eventually.

First Buffet Parlor Stages Ever Used

The buffet parlor cars used as the limited stages between Los Angeles and San Francisco are the first motor coaches fully equipped with lavatories, toilet, and kitchen facilities ever used on any stage or bus line. Two of these cars are in regular week day service and the company maintains an extra car at Los Angeles for emerg-

ency purposes. They are of special design, mounted on heavy rigid frames, and are reinforced throughout with one-half inch steel panels. The extra long double deck rear springs and air springs, front and rear, give a complete cushioning effect, so that these cars are very comfortable and have excellent riding qualities without noticeable vibration.

The car body is built on lines radically different from the usual design and has a graceful stream line effect. The usual inside baggage compartment is absent, as all baggage is carried on top or in the driver's compartment. The driver occupies a compartment separate from the passengers to avoid any possibility of his having his attention diverted from the task of driving, as the schedules are very fast and the steward, who accompanies the stage, attends to the wants of the patrons.

The water for the toilets and wash basins is supplied from pressure tanks placed under the car body. The



The Pickwick Stages System

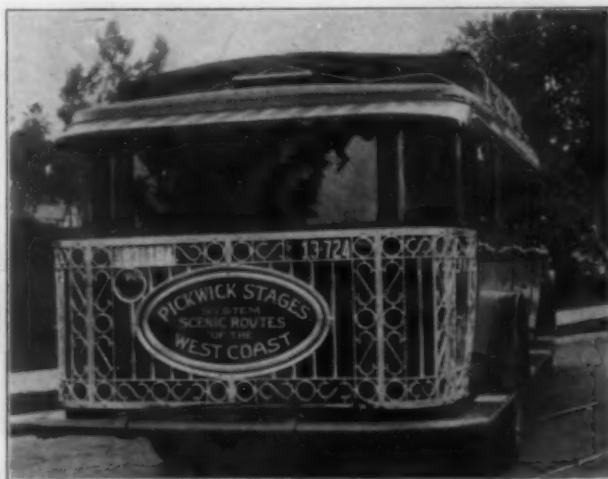
closet flushes into a sealed chemical tank under the coach, and this is emptied at designated points enroute. These cars also have ice water drinking fountains which take their supply from the pressure tanks. The kitchen is equipped with an electric range which receives its current from a storage battery that is charged at terminals, and hot meals or cold lunches are served en route whenever ordered.

These stages are fitted with easy individual reclining chairs which are upholstered in rich mohair; the woodwork is black walnut, and the ceiling and panels are finished with velour. They have a separate women's compartment, as well as a smoking compartment which is also an observation section with large rear windows. The doors have large plate glass windows which may be raised or lowered like the windows in a sedan. The floor is covered with a deep pile carpet, and curtains of pleasing design may be drawn to shield the passengers from the sun. Every pair of seats is equipped with an individual wall lamp, and ceiling lamps controlled by the driver give excellent general illumination after dark.

These cars are 32 ft. long and 8 ft. wide. The lower part of the body is gray, the upper panels are light blue, while a belt of dark blue separates the two colors and extends forward to the nicked radiator. There is seating capacity for 20 passengers, and an average of 12 through passengers and four to six others going to intermediate points are carried every trip. A surcharge of \$1.50 is made on the limited stages, this being the only extra fare charge made on Pickwick stages, except for special round trip tickets having stopover privileges.

All cars are of sturdy construction and are designed to withstand the hard service of the mountain territory through which most of the routes are situated. Dual wheels are used on all cars and it has been found that they give improved traction on the heavy mountain grades. Every safety device is employed. In addition to the separate compartment for the driver the cars are equipped with extra large braking surfaces, and extra lights are placed on the fenders to outline the position of the stages to protect them from following cars. The side doors are 32 in. wide and 5½ ft. high, which makes entrance and exit easy.

It is the policy of this company to own its own terminals and its stations at the most important points, but to rent station accommodations or put in agencies at intermediate points, depending on the size of the town and the amount of traffic it supplies. Hereafter, all terminal buildings will be combination stations and hotels with a system whereby passengers will be assured accommodations at a moderate price upon arrival at destination. The recently completed terminal building at San Diego is the first of this type. At present, however, only the terminal stations at Los Angeles, San Francisco, San Diego, Phoenix and Yuma are owned; the remainder are under lease, but it is expected that combination buildings of



Rear View of a Sedan Bus

the type described will be erected at other points soon.

The basic rate of fare is three cents a mile and through tariffs are in effect with all connecting stage lines. Scrip books containing \$25 in coupons, which may be interchanged for tickets good on all stages, are sold for \$22.50. Commercial travelers' round trip coupon books, which permit stopovers at any or all stations within the limits of the journey, are sold at an advance of 10 per cent over the round trip rate, which is 80 per cent of the basic rate.

The operating organization is somewhat similar to those of the railroads, although there is no officer corresponding to trainmaster. The nearest approach to this position is that of inspector of transportation. Division

superintendents, who report to a general superintendent and who have charge of all agents, drivers, stations, and all transportation matters on their respective territories, are given wide latitude in the management of those affairs which are under their jurisdiction. All shops where shop superintendents are not employed are under the superintendents, and they assign drivers and stages to all local runs and arrange for emergency cars and the protection of runs. The superintendents having jurisdiction at terminals assign cars and drivers to the through



A Steward Serves Meals in the Buffet-Parlor Cars

runs and have charge of all equipment coming into the terminals.

Station agents, in the absence of the superintendent, are given authority to direct drivers and make any arrangements necessary to maintain schedules or protect runs. In this respect they occupy a position somewhat similar to that of station masters on French railways.

The general superintendents are given complete authority, under the supervision of the president to whom they report, on all operating matters, and they have direct supervision of the larger shops at Los Angeles, San Diego, San Francisco, Eureka, Phoenix, Ariz., and El Paso, Tex., where shop superintendents are employed. The inspectors of transportation who travel over all lines also report to the general superintendent.

Excellent Shop Facilities

Very complete shop facilities are maintained at the points mentioned above where general overhauling and complete rebuilding of the stages are done. Smaller shops capable of handling any class of ordinary repairs are maintained at Rosenberg and Portland, Ore., and at Salinas, Cal., Yreka, San Jose, Redding, Santa Barbara, El Centro, and Yuma, Ariz., Tucson, and Douglas. Rebuilding of stages is not done at the last named shop, but it is equipped to handle all other classes of heavy repairs. Arrangements are in effect with local garages at a number of points to take care of any minor repairs which may become necessary between terminals.

The largest shop is at Los Angeles where a normal force of 200 men is employed. The special buffet parlor stages, used on the limited runs between Los Angeles and San Francisco, were designed and built at this shop, which is equipped for every class of work. Here most of the work on the motors is done and new engines are fitted for service as they are secured. The Pierce Arrow model 66 motor is used on all Pickwick stages, except on a few of the lighter cars which were acquired through mergers and consolidations with other stage companies. All motors after being overhauled are given a test run on a special rack before they are put in service.

Maintaining Motor Bus and Truck Axles



*Regular and thorough inspections
and proper lubrication are
essential*

By P. W. Sloan

Service Manager, The Timken-Detroit
Axle Company

THE front and rear axles of any motor vehicle are important and vital parts, and as such should receive careful attention in the way of inspection and maintenance in order to keep them in first class condition at all times.

Inspection should be performed by a thoroughly competent mechanic who knows where to look, and what to look for, in making an inspection. This will tend to prevent expending unnecessary labor and parts. It will also insure the necessary and important parts being taken care of at the proper time, and help to maintain efficiency and to eliminate the possibility of untimely break downs. Even though the inspector is very competent, it is wise to supply him with charts and report forms to follow and report on. The master mechanic or superintendent can, by referring to these inspection charts and reports, quickly decide whether a certain service operation has been required too frequently and take steps to eliminate such excessive expense.

For example, suppose that on a certain day a gallon of oil had been placed in the rear axle of a motor coach or truck in order to bring the oil to the proper level, and a day or so later when the next inspection was made it was found that the same rear axle required another gallon of oil. A competent master mechanic or superintendent, upon receiving the report informing him of this circumstance, would immediately realize that an oil leak had occurred and would see that this piece of equipment was given special attention to prevent waste, and to avert the serious trouble that would surely result from lack of sufficient lubrication. Competent inspection is one of the most important phases of maintenance, and too much attention cannot be given to its efficiency.

Front Axle Inspection

The front axle should be inspected at the end of every 5,000 miles in operation. First, look inside the front wheels, close to the hub, and see if there is any sign of grease leakage. Next remove the front wheels and wash the hub and bearings thoroughly with gasoline or kerosene. If an oil leak has been noticed, examine the oil seals for wear, looseness or any other condition that may have caused the leak. Make certain that the contact

points are smooth and are not cutting the oil seal material.

Also inspect the hubs to make certain that there are no signs of failure or cracking, and that the bearing cups are properly seated and are not loose in the hubs. Be sure that bearing cups have not become worn or pitted to such an extent that a failure may occur before the next

inspection.

The steering knuckle should be thoroughly checked to see that the bearing fits properly as to size, and that no grooves are being cut in it because of improper lubrication or other cause. Grooves or cuts of any kind will localize strains and may cause the part to break in operation. The steering knuckle pins should be checked for



Cleaning Axle Parts to Facilitate Inspection and Proper Reconditioning

looseness. The oil grooves, through which the lubricant feeds to the operating surfaces, should be inspected to make certain that they are not clogged.

The steering connections and the steering cross tube should be thoroughly checked for looseness, breakage of any small parts, and lubrication facilities.

When inspecting the steering connections make certain that all locking devices, such as cotter pins, etc., are securely in place. Be certain that cotter pins have been properly spread and that the full cotter pin has been assembled. In many instances a mechanic will take such a part out in service work, and in replacing it—because the cotter pin holes do not line up accurately—will split

the pin in half and assemble only half of it in place. This is an extremely bad practice and should not be tolerated.

The spring clips should be checked, and if they are not tight they should be tightened up very thoroughly. The toe-in of the front axle should be checked and adjusted to its proper setting as determined by operating conditions. After inspecting the front axle, the disassembled parts should be carefully reassembled and securely and properly locked in place by the devices provided for this purpose.

At the end of every 50,000 miles, the complete front axle should be removed from the motor coach or truck and completely disassembled, taking each part out of the unit and giving each one a thorough inspection. Replace any defective or worn parts with new ones, and reassemble. Repaint, and you have what practically equals a brand new axle.

Rear Axle Inspection

At the end of every five thousand miles in operation, the inspections described below should be made. In inspecting a rear axle of the full floating type, the inspection should be practically the same as described above in connection with the hub and spindle of the front axle. The hubs should be carefully inspected for cup looseness, etc., and oil seal parts checked. In inspecting the semi-floating or fixed hub type of rear axle, the keyway of the hub, which is keyed to the axle shaft, should be checked as to its fit. If it is loose on the axle shaft, or if the key does not fit the axle shaft and hub properly, or if any of the parts have become worn to such an extent that a new key will not fit it properly they should be replaced, or the keyway should be enlarged and a new key assembled to fit the axle shaft and hub. However, this practice should not be encouraged, as it is



Checking Warm Wheel after Assembling for "Run-Out"

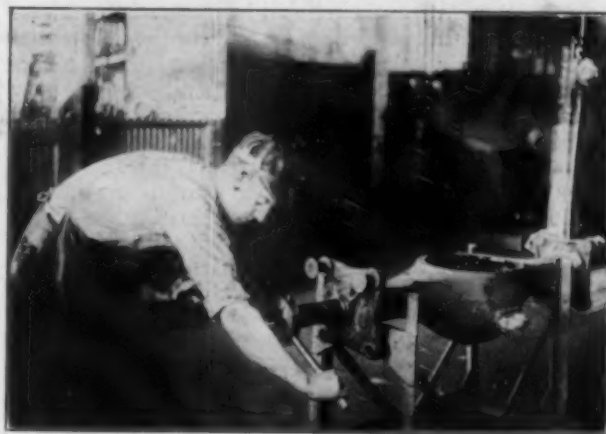
better to standardize so that it will not be necessary to carry several sizes of the same part in the supply room.

After the wheels have been removed, the brake drums should be inspected for both wear and for tightness to the wheels. The drum should be indicated with an indicator to check its concentricity with the hub. It may be discovered that the hub bolts holding the drum to the wheel have loosened, allowing the drum to shift. This should be corrected, and it may be necessary to turn the drum to refinish the brake surface or to replace it. This should be done after the drum is mounted on the wheel,

and the inside or brake diameter should be turned true with the hub cup or running parts so that it runs within one ten-thousandths of an inch.

The brake shoes should be inspected for lining conditions. Be certain that the lining has not worn down below the rivets, otherwise the rivets will cut the drum. Also make sure that the lining is not soaked with oil, and that it has not become glazed.

The cams which operate the brake shoes should be inspected for wear into the cam face on the brake shoe. If wear has occurred to such an extent that it affects the operation of the brakes, machine the face of the



"Re-chasing" Threads on Housing Tube of Full Floating Type Axle to Insure Ease and Accuracy of Adjustment of Wheel Bearings

shoe against which the cam operates and place a steel plate on the shoe or replace the shoe with a new one. The bushings which hold the cam-shaft in place should be checked for the possibility of lubricating and for wear. Make certain that the lubricant can get to the operating surfaces. The brake shoe pins or other anchor points should be inspected for wear and lubrication possibilities. In some cases it is not necessary to lubricate these pins, as the movement is so small that lubrication is unnecessary.

Inspect the worm shaft bearings for end play. If any unusual amount of end play exists over and above the required amount, the bearings should be removed from the carrier to determine just what has caused this condition. If the excessive end play is not corrected, the pounding of the bearings back and forth may result in destruction of the bearings. This would, of course, affect the internal working parts of the axle and might result in a very expensive repair job. Inspect all the oil seal parts in the carrier assembly, and if any oil is leaking the stuffing box should be tightened up or repacked with new packing.

The axle housing should be carefully examined. See that the bolts which hold the driving unit in the axle housing are tight. Be certain that the spring clips are tight. Check all other bolted parts and see that their fit and tightness are such that they will stand the severe strain which is usually imposed on a rear axle.

The operations described above are, in reality, more or less routine, and are intended to determine whether any repair work is necessary on the external parts of the rear axle.

Every 50,000 miles, the entire rear axle should be removed from the vehicle. Next remove the carrier assembly from the housing and check thoroughly. To remove the carrier from the housing, it is necessary to

remove the axle shafts. Inspect these thoroughly at this time.

The carrier assembly or driving unit should be thoroughly washed with gasoline or kerosene, so that it is possible to see what wear has taken place. The worm should be carefully inspected for wear. The proper bearing or contact between the worm and worm wheel should be checked. This should not shift from its factory setting unless unusual wear has taken place at the differential bearing. If the worm wheel shows excessive wear on the driving side and not on the coast side, it can be reversed so that the coast side will become the driving side, and vice versa. If it is decided not to reverse the worm wheel, an inspection should be made of the differential bearing. This is done by removing the differential cap and examining the cups for wear and other conditions which will interfere with their operation. Also see that the differential gears are not chipped or broken, and that too much side play does not exist between the side gears and the differential and differential case.

Too much play or wear at this point may allow the differential side gears to come out of mesh with the differential side gears to come out of mesh with the differential pinions to such an extent that these parts will be bearing only on their points, and failure or chipping will result. This failure may destroy the differential, and the broken parts may pass through the other working parts of the axle and result in ruining the entire unit. This can be remedied either by replacing the differential cases or by machining the differential case so that a bronze thrust washer may be assembled between the side case and the gears. All cases which are machined should be held to definite dimensions, so that the same size or thickness of washer can be used in all repair jobs of this kind.

If the worm wheel shows unusual wear and has developed any sharp or rough edges, use an ordinary bearing scraper and round off or remove these edges. The wheel will then be capable of going another 50,000 miles in service.

Likewise, if the worm shaft is worn or shows any rough surfaces, polish so that they are smooth and the operation of the worm with the worm wheel will not cause any cutting. Also inspect the keyway of the worm shaft to make sure that it is up to size and will not cause any trouble from looseness.

The only inspection that should be made on the carrier casting itself is to see that the bearing cups fit properly in their respective places, and do not turn into their housings when assembled. See that the oil channels and oil holes leading to these bearings are cleaned out, and that there is no sediment of any kind, so that the oil will flow freely to the bearing races. All threads, such as in the differential adjusting nut, should be thoroughly cleaned out and not cross-threaded or burred up. The nuts should assemble and work easily.

In reassembling parts, make sure that the threads and their respective parts fit properly—not loose enough to allow end play, and not tight enough to make a faulty adjustment possible. A tight thread often deceives a mechanic when he is adjusting a mechanical part.

See that all locking devices are properly assembled and thoroughly locked in place. After the assembly is complete, check the worm wheel and all its bearing adjustments with an indicator. Do not guess at an adjustment. Be accurate. Check the end play of the worm shaft with an indicator, and keep to the prescribed limits.

In riveting a worm wheel to a differential, it is best to use cold rivets. In a great many cases this cannot be done, as expensive equipment is required for cold riveting. When hot rivets are used, do not heat them too much and be certain to drive them in so that when they cool

and shrink there will not be enough looseness to cause trouble.

Careful practice of the principles laid down herein will result in a big reduction in maintenance costs.

Lubrication

Constantly bear in mind that proper lubrication at all points is of great importance, and that it is better to use oil and grease in small quantities at frequent intervals than in large quantities only occasionally. If the lubrication is neglected, the necessity for adjustments and replacements will increase in direct proportion to the lack of proper lubrication.

Even the highest priced lubricant is vastly cheaper than labor and parts, and the cost of lubrication represents only a very small percentage of the total operating cost.

Only the highest grade of lubricants should be purchased, and their correct and conscientious application should be carefully watched by the mechanical head, as this is clearly the most important means of keeping maintenance costs low.

Oil is one of the most difficult things in the business



Inspecting Parts of Dis-assembled Front Axle

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Competent mechanics realize the importance of proper lubrication, but usually lubricating is left to an inexperienced mechanic or oiler. This class of help may ignorantly neglect this very important phase of maintenance. Charts or guides, showing in detail how to properly lubricate the motor coach or truck, should be provided.

These charts or guides should be so gotten up that they will instruct the oiler to oil or grease certain operating points at the end of a certain number of miles. The oiler should be trained to see that the grease or oil gets to its proper destination—not merely started through a lubricating fitting but never reaching its destination because the lubricating trough is clogged, allowing the lubricant to ooze out between openings.

Too many operators think they lubricate their equipment thoroughly, when as a matter of fact the oil channels are so badly choked with dirt and caked grease that the lubricant never gets to the wearing points.



Mack Tractor and Fruehauf Trailer Used in N. Y. C. Freight Service

N. Y. C. Uses Tractors and Trailers

*L. C. L. freight between five stations in New York handled
by four power and fourteen carrier units*

THROUGH a contract with the Motor Truck Renting Corporation, the New York Central is handling L. C. L. freight by tractor and trailer from its five freight stations in the New York district to a consolidating station, where it is loaded into through cars. At these five stations, from five to six million pounds of outbound freight originate each month for destinations to which through cars are not loaded from the individual stations.

The contract covering this transfer of freight specifies that empty hauling units must be available at each freight station at all times in order that incoming freight may be trucked immediately to a hauling unit, saving valuable floor space in the station. Thus considerably more of the time of the hauling units is spent at the docks in loading and unloading than in moving freight from one station to another.

Equipment Used

In order to meet this condition tractors and semi-trailers were decided upon as the equipment best adapted to fulfilling all conditions. The tractor and semi-trailer operation, with three to five trailers served by one tractor, permits empty or loaded trailers to be spotted at loading or unloading points, while the tractor is in almost continuous operation. Therefore, it is the inexpensive trailer unit which does the waiting and the expensive tractor, the maximum running. Furthermore, the use of the tractor and trailer permits the operation of a smaller power unit than would be necessary for

the same load on a truck with less weight per wheel.

The tractor and semi-trailer are also more easily handled in traffic than a truck of equal over-all length,

SAVINGS EFFECTED BY USE OF TRACTORS AND SEMI-TRAILERS VS. TRUCKS			
Operating Costs—		Per month	Per day
6-Ton trailer:			
Investment—\$2,800			
Depreciation—10 per cent.	\$23.33	\$0.90	
Average interest at 6 per cent.	7.70	0.29	
Repairs	9.64	0.37	
Tires	2.00	0.08	
Insurance (included in tractor expense)			
License	2.08	0.08	
Total	\$44.75	\$1.72	
Tractor:			
Per day		\$32.50†	
5-Ton truck:			
Per day		\$25.60†	
Savings—			
Daily cost with trucks—14 at \$25.		\$350.00	
Daily cost with tractors and trailers:			
14 trailers at \$1.72	\$24.08		
4 tractors at \$32.50	130.00	154.08	
Daily saving		\$195.92	
Reduction in cost—56 per cent			

*Allowing for interest earned by depreciation reserve.

†Truck and tractor daily costs include depreciation based on five-year life insurance, license, garage, painting, administrative and office overhead expense, profit and operating expenses, including gas, oil, grease, tires, repairs and driver's wage.

or even a truck of equal carrying capacity. This is made possible by the flexible coupling at the "fifth wheel."

Mack tractors manufactured by Mack Trucks, Inc., New York, and Fruehauf semi-trailers manufactured by the Fruehauf Trailer Company, Detroit, Mich., were

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the same load on a truck with less weight per wheel.

The tractor and semi-trailer are also more easily handled in traffic than a truck of equal over-all length,

SAVINGS EFFECTED BY USE OF TRACTORS AND SEMI-TRAILERS VS. TRUCKS		
Operating Costs—	Per month	Per day
6-Ton trailer:		
Investment—\$2,800		
Depreciation—10 per cent.....	\$23.33	\$0.90
Average interest at 6 per cent.....	7.70	0.29
Repairs	9.64	0.37
Tires	2.00	0.08
Insurance (included in tractor expense).....		
License	2.08	0.08
Total	\$44.75	\$1.72
Tractor:		
Per day		\$32.50†
5-Ton truck:		
Per day		\$25.00†
Savings—		
Daily cost with trucks—14 at \$25.....		\$350.00
Daily cost with tractors and trailers:		
14 trailers at \$1.72.....	\$24.08	
4 tractors at \$32.50.....	130.00	154.08
Daily saving.....		\$195.92
Reduction in cost—56 per cent		

*Allowing for interest earned by depreciation reserve.

†Truck and tractor daily costs include depreciation based on five-year life insurance, license, garage, painting, administrative and office overhead expense, profit and operating expenses, including gas, oil, grease, tires, repairs and driver's wage.

or even a truck of equal carrying capacity. This is made possible by the flexible coupling at the "fifth wheel."

Mack tractors manufactured by Mack Trucks, Inc., New York, and Fruehauf semi-trailers manufactured by the Fruehauf Trailer Company, Detroit, Mich., were

selected as the equipment to be used. The Fruehauf semi-trailer has a positive hand-crank operated means for lowering the front wheels so that the driver must get down from the cab and lower the front wheels before he uncouples. This eliminates the danger of the trailers falling to the ground, with damage to the load as well as the necessity for jacks to raise the front end for re-coupling.

The practice of the Motor Truck Renting Corporation in using a Fruehauf trailer is to raise the front wheel just enough to give safe clearance when coupled. Thus, if the tractor should be disconnected accidentally from the trailer, the load can not drop far and the trailer can be raised by hand by the turning of a crank.

The first tractor and trailers were purchased in October, 1925. One tractor and five trailers at that time

\$32.50, a high cost because the tractor covers more miles, makes more trips, and hauls more loads. The total cost of 14 trucks would total \$350 a day while the cost of 4 tractors and 14 trailers is only \$154.08, a saving of \$195.92 a day or a reduction in hauling costs of 56 per cent.

The accompanying table shows in detail the savings effected by the use of semi-trailer equipment rather than motor trucks.

This article is based on a survey of the use of Fruehauf semi-trailers by the Motor Truck Renting Corporation in New York, made by the A. C. Nielsen Company, Chicago.

Union Pacific to Add Two Bus Lines

APPPLICATION has been made by the Oregon-Washington Railroad & Navigation Company, a subsidiary of the Union Pacific, with the state public service commissions of Washington and Oregon for permission to operate two additional bus lines between points in those states. The Oregon-Washington Company is already operating buses between Walla Walla, Wash., and Pendleton, Ore.

The shorter of the two additional proposed lines will extend from Walla Walla to Yakima, a distance of approximately 125 miles. The buses will connect with all

TRACTOR AND TRAILER OPERATING DATA

Tractors in use—4 units, motored as for 3½-ton trucks.			
Trailers in use—14 6-ton semi-trailers.			
Loads per day.....	24	Average	
Loads per day per tractor.....	6	Average	
Loads per day per trailer.....	1.7	Average	
Tons per average load.....	6.5		
Length of average trip.....	10	Miles	
Average day.....	6	Hours	
Days worked per week.....	306		
Days worked per year.....			
Tractor operating time:			
Hours in service.....	Standing	Running	Per cent running
10.....	1.50	8.50	85.0
10.....	3.00	7.00	70.0
7.....	2.00	5.00	71.4
11.....	2.25	5.75	52.3
10.....	3.50	6.50	65.0
10.....	2.50	7.50	75.0
10.....	2.25	7.75	77.5
7.....	3.00	4.00	57.1
5.....	1.50	3.50	70.0
9.....	3.25	5.75	63.9
Totals 89.....	27.75	61.25	68.8
Average 8.9.....	2.78	6.12	

replaced from four to five trucks that are now used for other work. Since that time the tonnage has increased so that 4 tractors and 14 trailers are now in service with 4 more trailers on order. The first trailers purchased had rack bodies over which a tarpaulin was drawn. The more recent purchases have standard steel covered bodies with rack ends and curtains. The over-all dimensions are 18 ft. by 7 ft. by 7 ft. 4 in. high.

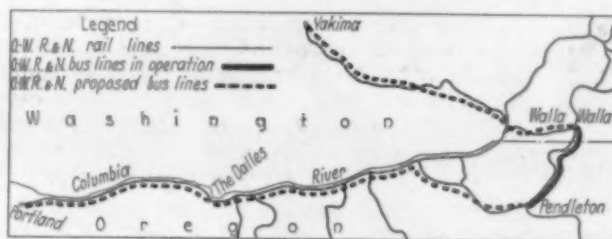
Plan of Operation

The tractors are operated on a definite time schedule between freight depots and the consolidation station and trailers are moved, whether fully loaded or not. Consequently, the loads vary between wide limits, the average load being 6½ tons. A single tractor makes an average of six round trips a day, whereas a trailer will average only 1.7 trips.

The accompanying tables of operating data shows other items of interest.

All except minor repairs to the tractors are made by the truck manufacturer's local service station. One mechanic in the Motor Truck Renting Corporation garage handles small repairs on trucks and tractors and all work on the trailers. The simplicity of construction of the latter and the absence of a power unit results in low repair costs—the entire operating expense of a trailer being only \$1.72 a day. The tire cost is nominal since the trailer is standing still most of the time.

The cost of operation of the tractors and semi-trailers has been substantially less than the cost of operation of trucks in similar service. If this freight transfer work were handled with trucks under the present contract terms, as many units would be required as there are trailers now in service. The cost of operating a 5-ton truck is \$25 a day. The cost of operating a tractor is



Present and Proposed Union Pacific Bus Lines

trains at terminal points and will use railway stations. This bus service is designed to replace the present rail motor car service between Walla Walla and Yakima. Application for a certificate permitting the operation of this line has been made to the Department of Public Works of Washington.

The other proposed bus line will extend from Portland, Ore., to Pendleton, a distance of 231 miles and the company proposes to purchase five 25-passenger buses to be used on this route, four to be in daily operation and one held in reserve. The proposed schedule will include two round trips daily over this route, the buses leaving Portland for Pendleton at 7:15 a.m. and 1:00 p.m. and arriving at their destinations at 4:55 p.m. and 10:40 p.m., respectively. Similar schedules are proposed for the westbound trip.

Stops will be made at The Dalles for meals and railway stations will be used as stopping points for the buses at all towns between Portland and Pendleton. Application will be made, however, for permission to use the municipal bus terminal in Portland. This route will leave Portland over the scenic Columbia river highway. No definite date to begin bus service on either of these lines has been fixed but it is expected that operations will commence within 90 days from the time the necessary certificates are granted.



Buses Meet the Most Severe Operating Conditions

Keeping Buses Ready for Service*

An analysis of the facilities and methods shown to be necessary by experience

By Merrill C. Horine

Sales Promotion Engineer, International Motor Company, New York

SERVICING motor buses is a new art in the automotive industry, unlike and more severe than the servicing of any other class of automotive equipment. Buses require more service than passenger cars, trucks, tractors or any other motor vehicle. The exactions of such service are more severe in several respects. Emergency calls are the rule rather than the exception, as are night, Sunday and holiday calls. It is found that in motor bus service promptness in making adjustments, repairs or replacements is of greater importance than cost. Interchangeable reserve units or assemblies are indispensable to efficient motor bus service and represent, perhaps, its chief characteristic.

Motor buses not only demand more prompt and readily available service, but they require more of it; they require a higher standard of quality in service work, more painstaking inspection and supervision, more careful attention to appearance and cleanliness than is ordinarily found even with high-class passenger cars. In addition they are probably the most difficult type of automotive equipment to work upon for they have the low build and condensed structure of the passenger car with a closed body, both of which features are prejudicial to ready accessibility, with the size and weight of truck parts.

Severity of Service

These different requirements of motor bus service arise from radical differences in the operating conditions to which they are subjected. Motor bus service is the heaviest duty to which any automotive products are applied, which is to say that they operate most nearly at maximum output capacity for the most sustained periods. They cover considerably greater mileages even than taxicabs, averages of 100,000 miles per year being by no means exceptional. Their operation involves the

maximum active factor, namely, 365 days per year, 20 hours per day, 7 day per week.

Time is the big thing in bus operation. Time enters into every phase of bus activity. Buses are operated on more or less rigid schedules; the value and convenience of the service to the public is largely judged by two aspects of time—adherence to schedule and speed of running. Time, therefore, meters both the volume of income and the popularity of the service, operating, as buses do, a greater number of hours per day and having no off days, the time available for mechanical attention is limited, while at the same time the cost of loss by active time is excessive. A greater loss is the loss of public good will and patronage which results from interference with schedules. Bus passengers dislike exceedingly either delays or transfers. Accordingly, speed in performing service jobs, wherever consistent with quality and reliability, is the paramount consideration. The truck or passenger car owner may well hesitate to authorize overtime work; but to a bus operator, the cost of overtime is insignificant compared with the cost of a delayed repair.

Delayed Repairs Uneconomical

Many operators of private vehicles, commercial vehicles, taxicabs and livery cars deliberately delay attention to smaller maintenance jobs, preferring to have many things done at once when a serious repair becomes necessary. Some even go so far as to wait until the vehicle actually fails on the road before allowing it in the shop. Questionable economically as this is in any case, it is unthinkable in bus service. Maintenance of all kinds must be confined as nearly as possible to the brief rest period occurring in the wee hours of the morning. During the normal 20-hour working day, the bus must stay on the job. There must be the remotest possible chance of defective operation during that time. Preventive maintenance, therefore, is a primary necessity in bus

* From an address before the National Automobile Chamber of Commerce Service Forum, Detroit, Mich.

service. Lubrication, inspection and adjustment must be a matter of frequent and scheduled routine. Repairs of all sorts must be made in the incipient stage of the trouble. All repairs must be of a permanent, reliable kind. Replacement of worn-out parts must precede actual breakdown sufficiently to insure against breakdown on the route.

Bus maintenance must go farther than mere mechanical upkeep and repair. It is not enough that the bus shall be capable of covering its route punctually and safely; it must also provide a clean, silent, easy ride and present an attractive appearance. Maintenance must therefore be directed toward keeping the body clean and in repair, as well as the chassis. Seats, windows and floor must be clean. Torn, cut or ragged upholstery or curtains must be repaired. Worn spots on the floor covering must be repaired, broken windows replaced, ventilating and lighting fixtures kept in order. Scratches on the body, dents in fenders or body panels, body squeaks and bumper rattles must be corrected. These are things that should be done by all operators, and which are being watched carefully by some; but which in the infancy of the business and the irresponsible nature of some of the operators are temporarily more marked by their neglect than proper attention. The future, however, will demand greater efficiency as the price of survival.

Unlike other types of operation, that of motor buses inevitably involves participation in service to a greater or lesser extent by the operator. Some self-service is indispensable. Among passenger car owners the days of owner-maintenance are about over. Among trucks it is chiefly confined to operators of fleets. But bus operators, large or small, must maintain shop facilities to some extent. Just how extensive such self-service must be in any given case depends upon the size of the



Delayed Repairs to Buses Are Uneconomical

operation, the distance from organized service and the exactions of the franchise and public demand with respect to regularity of service.

Degree of Self-Service

It will be obvious that the degree of self-service and the extent of owned service equipment which the operator himself must provide, as well as the location of such equipment, is affected to a controlling extent by the territories in which his operations are conducted and by the service facilities provided by the manufacturer of the bus which he operates, within such territories.

Often the owner-driver on a small or co-operative bus line efficiently services his vehicle within limitations. Small to medium fleets usually maintain a central repair shop, while the larger fleets have complete service plants with emergency repair shops located at remote points. Several of the street railway companies which are operating buses employ their car barn shops for motor bus maintenance. Whatever the scope of the operator's

self-service, however, none can be independent of the manufacturer so far as service is concerned. The smaller operators must call upon the service station of the manufacturer or his authorized agent for all but the smaller, simpler jobs of maintenance, must depend upon him for replacement parts almost entirely and usually is dependent upon his advice for his maintenance policy. Those operating medium sized fleets and having their own repair shops usually fall back upon the manufacturer's branch or dealer service station for the higher class and more difficult jobs of maintenance, such as bearing and piston work, cylinder regrinding and electrical work. They usually depend, similarly, upon the local service station to supplement their usually scanty stock of parts and look to the local service manager to solve their knottier mechanical problems. Even the biggest operators employing service plants in which some of the smaller parts are actually manufactured and from whose stockrooms the manufacturer's own branch often borrows certain parts is dependent upon the manufacturer for his supply of parts, for technical information, for special tools which he uses in his shops and for service engineering.

Successful bus service, regardless of by whom rendered requires special equipment and the services of specialists. Personnel and management must be bus-trained. In numerous cases previous experience in passenger car or truck service has proven more of a detriment than an advantage, though a well-balanced combination of the two is preferable to experience confined to the relatively coarse and simple mechanism of electric or steam railway equipment.

Bus Equipment Specialized

Equipment must be complete and specialized for bus work. Such equipment, of course, need not be in one shop; but what the operator lacks, the service station should have. In the owner's shop both the personnel and equipment must be specialized or differentiated. Makes must not be mixed; that is, the mechanic who works on one make must be allowed to work on that make exclusively. If a mixed fleet of different makes is ever justified, it can only be in a fleet that is large enough to sequester each make in its own special bay of the shop, cared for by its own little group of specialists. Under no circumstances should buses be serviced in the same shop, by the same mechanics or with the same tools as railway cars, except, of course, that bus bodies of the conventional city type are near enough to car bodies so that one body shop and point shop may serve both. The more modern types of parlor car, sedan and suburban bodies, however, have very little in common with railway cars either in construction, finish or trim, being examples of coachwork rather than car-building.

Truck service does not mix well with bus service, passenger car service even less so. Nevertheless, it is permissible to service two or three such in a shop primarily maintained for bus service.

In a bus service station, more so than any other type of automotive repair shop, it is essential that the stock of parts be so arranged as to be instantly accessible. Unit assemblies—presumably taken from buses in exchange for similar assemblies, and completely overhauled and tested—must be always ready, if not in the shops of operators, then surely in the maker's service station.

The clerical system should be such as to function without delaying the work. It must be recognized from the start that the losses possible through errors in charging mechanics' time, stock requisitions, etc., while undesirable, nevertheless are likely to be insignificant

compared with the cost of needless delay of holding buses in the shop.

Delays Should Be Avoided

Work on a bus should start as soon as physically possible. Delays in waiting for tools, jacks, special rigging and appliances, requisitions to be signed, parts to be taken from stock, or obtaining a job-number should be avoided by providing for as many of these as possible in advance, the balance being attended to by a clerk or helper while the mechanic works. Inspection of the work by the foreman or inspector in charge should be made as the job progresses. Better that he should wait for a mechanic to get the job ready for him than that a vehicle, worth as much as a Pullman car and capable of a higher hourly earning rate, should wait his pleasure. There should be no hesitation about overtime—no delay for meals.

Methods of repair must always be the quickest safe methods. This means, of course, interchangeable replacement assemblies, such as a complete engine assembly, which may be exchanged for the ailing part in the bus, allowing the exchange to be made in the normal layover period of the bus, so that it will lose no time from schedule, the defective unit being then overhauled and repaired and put in first-class condition by a day force of regular mechanics, taking its place in stock when completed ready to replace a similar unit in a bus when required. This method of repair is to be used, of course, only where time is saved. A broken valve-spring may be replaced in less time than the entire power plant requires for replacement; but the latter can be accomplished in less time than it takes to remove the carbon and grind all the valves. The rule should be that the limit of time allowed for any detail operation equals the time it takes to replace the entire unit assembly.

Quick-cleaning methods are essential, not only to good



Motor Buses Require the Most Careful and Prompt Service

workmanship and economy in cost of repairs but also to speed. It has been demonstrated repeatedly that work can be performed on clean machinery in much less time than on that which is covered with grease, dirt and caked mud. Steam or high-pressure water vapor cleansing equipment should be installed in every bus repair shop.

To fulfill all of these requirements, it is necessary that every bus shall have access to certain indispensable maintenance equipment, if not in the operator's own shop, then in the local service station and always kept ready for instant use. The bus shop's decks should always be cleared for action.

Use of Pits or Trestles

Because of the extremely low suspension of modern buses, together with the size and weight of parts, there

is scant room to work under a bus. Either a pit or a trestle must therefore be provided for every bus being serviced. The ordinary type of pit is generally unsatisfactory, not only because of its unsanitary nature, but also because of the fire hazard occasioned by the accumulation of inflammable oils and also because of the menace to the health of mechanics due to the accumulation of the products of combustion, such as carbon monoxide. The terrace type of pit, however, in which the pit opens onto a lower portion of the shop floor, where the benches are situated and where proper ventilation outlets are provided at low level, is undoubtedly the most satisfactory arrangement, particularly where



Some Electric Railways Consolidate Their Car and Bus Repair Facilities

shop headroom does not permit the use of a trestle. Quick-acting jack-stands must be provided for the heavier under assemblies, such as axles, transmissions, etc. An overhead monorail with a block and fall or a portable crane is necessary to handle the power plant. Special means for raising the body quickly must also be provided.

Besides the usual machine tools, fixtures, shop appliances and small tools essential in any automotive repair shop, quick work demands certain special tools and contrivances adapted to use on each particular make. Means should also be provided for running in all overhauled unit assemblies. An engine running-in stand may be belted to the line-shafting, the same stand being adapted to receive transmissions, shaft brakes and rear axles.

Steam or high-pressure water-vapor cleansing equipment should be installed in every bus repair shop to clean thoroughly the chassis and then, for component parts and assemblies, a steam washer or caustic bath should be provided. To avoid the soiling of the bus unnecessarily while repairs or adjustments are being made, there should be covers for fenders, floor and seats. This not only avoids soiling the clothing of passengers, with possible resultant damage claims, but through relieving the workman of the necessity of avoiding contact with such parts, makes his work easier and quicker.

Unit Assemblies

Although the spare unit assemblies required will vary with different makes and types of bus, the following list will in most cases be found fairly comprehensive. Each of these assemblies should be available whenever needed for exchange with similar parts on buses actually in operation.

- Engine, complete.
- Radiator.
- Magneto.
- Generator.
- Water pump.
- Vacuum tank.
- Gasoline tank.
- Battery.
- Clutch.

Transmission, complete.
Driveshaft and joints.
Front axle, assembled with spring.
Rear axle, assembled with brakes, springs and shock-absorber clips.
Rear hub and brake-drum assembly.
Relined brake shoes (pair).
Shaft brake assembly.
Fenders (black enameled).
Bumpers.
Lamps.
Horn.
Windows (all types).
Doors, complete.
Seats.

Such are some of the outstanding requirements for efficient bus service, whoever may provide the equipment and facilities required or performed the work. Many have harbored the theory that in time the user will shoulder the entire burden of servicing buses, just as the steam and electric railways have done with their equipment, some railways even building their own locomotives and cars. This feeling has been fostered by the abundant evidence which is at hand that the railways will be the major operators of motor buses, it being a natural assumption that they will endeavor to follow time-honored practice in such operation.

Manufacturer's Service Important

The facts, however, do not seem to support this line of logic, for not only have those operators who operate in complete independence of the manufacturer failed to demonstrate any gain in either efficiency or economy by this means, but many have recognized the need for more specialized service for the motor bus with demonstrated benefit.

Of course, there have been examples of exemplary maintenance by operators who used imported equipment, built their own or purchased it of domestic makers who were unable to service it. As the larger operators gain experience there will doubtless be others whose efforts along this line will be similarly satisfactory. There will also doubtless be many attempts at the same thing which will be dismal failure.

The great majority, however, now and for some time to come, cannot dispense with the aid of the manufacturer in servicing buses.

If the manufacturer were given his choice in the matter—particularly one who had had any considerable amount of experience in bus servicing—he would undoubtedly prefer to see the large traction companies handle the entire job of service unaided, so far as their taste for the job is concerned; but most of them know enough about the exactions and pitfalls of bus service not to delude themselves that they will ever be so free of service cares as are the builders of locomotives or cars.

THE MOTOR COACH OWNERS Board of Trade of New York has announced its plans to build a bus terminal near Forty-second street and Broadway at a cost of approximately \$350,000 exclusive of the land. The exact site, it is said, has not been chosen, but two are under consideration. The plans provide for a three-story and basement building designed to accommodate 40 de luxe buses of the kind used in suburban service around New York. The ground floor and basement will provide space for the buses and the second floor will have a balcony containing waiting and rest rooms and a restaurant. It is stated that the Motor Coach Owners Board of Trade represents operators of 300 de luxe buses running into New York from surrounding territory, mostly in competition with railroad suburban service.

Chattahoochie Valley Begins Bus Operation

THE Chattahoochie Valley Railway has begun the operation of a motor bus between West Point, Ga., and Blecker, a distance of 27 miles. This line is operated on a two round trip daily schedule, six days a week, and the bus also runs to Standing Rock, Ga., on Saturday and Sunday mornings.

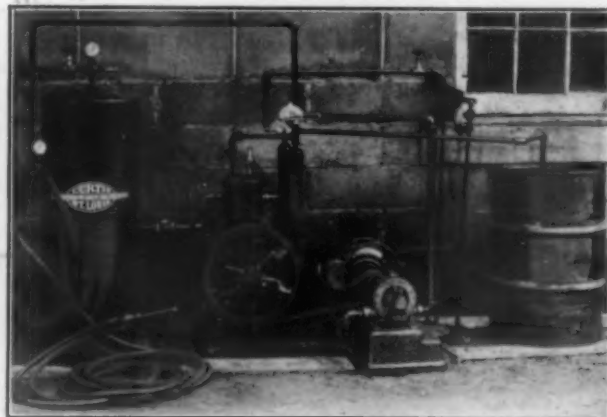
This operation is carried on by a subsidiary corporation, known as the Chattahoochie Valley Transportation Company. The charter of the company provides that both passenger and freight service may be operated over the highway if desired. The bus will replace two storage battery cars that have been in operation between the points served by the bus for the past 10 years.

The bus used is a six-cylinder Studebaker chassis manufactured by the Studebaker Corporation, South Bend, Ind.

It has a 184 in. wheel base and is fitted with a body of the sedan type, with seats for 21 passengers.

Airmist Car Wash System

THE hand-washing method of cleaning buses is a tedious job, requiring constant stooping, kneeling and scraping. These disadvantages can be considerably lessened by the use of the car-washing equipment shown in the illustration. The equipment consists of an air storage tank, a motor-driven air compressor and a soap and solution barrel, which, when installed, occu-



The Curtis Air-Mist Car Washing Equipment Occupies a Floor Space Three Feet Wide by Seven Feet Long

pies a floor space of 3 ft. by 7 ft. When the air tank is placed overhead, it requires a floor space of 3 ft. by 4 ft.

The operations involved in the use of the Airmist system of bus cleaning are simple. The first operation consists of blowing out the interior of the car and renovating the rugs and cushions with an air nozzle. The upholstery is then cleaned with the vacuum cleaner attachments.

The greasy parts of the car are next washed with any good cleaning compound, using an adjustable spray nozzle, after which the entire car body is wet down. Then the chassis and under body are cleaned with the adjustable spray nozzle, after which the body is sponged with soap water and rinsed with the spray. It is then thoroughly dried by means of the air nozzle and a chamois.



Exterior View of B. & O. Waldorf-Astoria Station, New York, Showing Train Connection Motor Coaches

How the B. & O. Operates Its Unique New York Terminal Service*

Detailed studies made to select best station locations, and to perfect operating plans — Additional equipment acquired

By M. F. Steinberger
Special Engineer, Baltimore & Ohio

SHORTLY after the entry of the United States into the world war when the railroads were placed under governmental control, the Pennsylvania station at Seventh avenue and Thirty-third street, New York, was assigned as a joint passenger terminal for the Pennsylvania, its subsidiary the Long Island, the Baltimore & Ohio and the Lehigh Valley. The use of this terminal under these conditions continued until August 29, 1926, when because of increasing need for the terminal by the Pennsylvania and the Long Island, the Baltimore & Ohio discontinued the use of this station as its New York terminal.

Some months before this date the officers of the Baltimore & Ohio began to make plans to continue to serve its patrons at New York in the manner which those patrons desired. Of course, the first step taken was to negotiate a return to the arrangement which prevailed before federal control, namely, the use of the Reading and Central of New Jersey tracks for the movement of the Baltimore & Ohio trains between Philadelphia and Jersey City.

The officers of the Baltimore & Ohio had observed with interest and it must be confessed with considerable concern, the increasing popularity of not only the private automobile, but of the motor coach. Observing this liking of the traveling public for motor coaches and at the same time realizing that it is desirable to deliver and receive its passengers as close to their final or from their

initial destinations as is economically possible, what more natural than that the railroad seize upon that mode of transportation, the motor coach, and use it in transporting its guests, as we call them, between Jersey City and New York, or Brooklyn?

How Should the Service Be Offered?

Having determined upon the means by which the passengers were to be transported the real work began. It was necessary to decide:

1. The manner in which the operation should be conducted, namely, whether by the Baltimore & Ohio itself, by a subsidiary company, or by contract with an established operator.
2. Where and how many stations should be established.
3. The route or routes which should be followed.
4. The number, type and character of motor coaches.
5. The character of the stations, their fittings, etc.
6. The ticketing and baggage arrangements.
7. The manner in which the operation should be conducted at Jersey City, and other stations, so passengers could leave or board motor coaches with a minimum of delay and maximum ease.
8. Multitudinous details (and they were multitudinous) connected with the establishment of this innovation in railroad transportation service.

Selecting Locations for the Stations

In the consideration given the proper location of stations our passenger traffic department, of course, had available information as to trend of travel and the location of strategic points by which the needs of travelers could best be met. Their studies, therefore, led to

*Abstract of an address delivered before the Society of Terminal Engineers, New York, on January 11.

the choice of the following places in the business, hotel and theatre districts as the points at which passengers were to be received and delivered.

1. In proximity to the Pennsylvania hotel and station.
2. McAlpin hotel.
3. Waldorf-Astoria hotel.
4. Pershing Square (opposite Grand Central station).
5. Vanderbilt hotel.
6. Consolidated ticket office (57 Chambers street).

After some experiment an additional stop was installed at Wanamaker's (Fourth avenue and Ninth street). In addition to these stops, early in November further stations were established on Joralemon street and at the St. George hotel in Brooklyn.

Who Should Operate the Motor Coaches?

Having decided that the proper method to be employed in transporting passengers between Jersey City and points east of the Hudson river was by motor coach, the next step was to determine upon the most desirable means of operating the motor coaches which would be employed. Three plans were considered, namely:

1. Operation by the Baltimore & Ohio, under its own operating office.
2. Formation of a subsidiary company to perform the services.
3. Negotiation of a contract with an experienced operator already functioning in New York.

The latter plan was the one adopted and the Fifth Avenue Coach Company was chosen as the operating medium, and a contract entered into with it. Among the reasons for this action were the fact that this company is the largest operator of motor coaches in New York, and has adequate garages, service stations, etc., and a trained personnel. Furthermore, it has so large a fleet that it is always in a position to supply surplus equipment to meet any emergency which may arise. It was obvious that with all these things in its favor, as well as the fact that the time to prepare for the installation was limited, such a company could establish the service with greater ease than the railroad could, as it would have had to build up from the bottom an operation with which its officers were less familiar than the coach company's staff.

Similar arrangements were made with the Public Service Transportation Company and for the same reasons, for a service between Newark and Elizabeth. We have received the same fine co-operation from that company as we have from the Fifth Avenue Coach Company.

Selecting Routes and Type of Equipment

Upon the conclusion of the preliminary negotiations covering the operations, and the decisions as to probable locations of the stations, studies were made to determine the routes to be used. Trial trips were made in motor cars and coaches over various suggested travel lanes; the time required and traffic interferences encountered, carefully noted and studied. As a result of these studies the coaches move over streets on which they can travel with the least interference and quickest time to reach the scheduled stops and stations.

Of course, it should be understood that in the event unforeseen traffic delays develop, the coach operators can exercise the right to deviate from the routes laid down, but are obliged to make the scheduled stops.

The question as to type and character of motor coaches then arose, and after careful consideration it was decided to place in the service what is known as the Y type coach, manufactured by the Yellow Coach & Truck Manufacturing Company of Chicago, they being of latest design and construction, giving convenient and comfortable accommodations with easy riding and smooth

operation. It was felt that the affiliation of these manufacturers with the principal metropolitan coach lines of the country gave them experience which enable them to produce the coach best fitted to the needs of this particular and specialized service.

Orders were then placed for 12 such coaches—10 for service between Jersey City and Manhattan, and 2 for the Newark-Elizabeth route which was installed at the same time.

Since that time the demands have been such as to make necessary the purchase of additional equipment, so that there are now in operation on the Jersey City-Manhattan-Brooklyn runs 22 motor coaches and two on the Newark-Elizabeth runs, making a total of 24 motor coaches in this service.

These coaches are of the de luxe type. In order to conform as nearly as possible to the Baltimore & Ohio train color scheme, the body of the coaches is painted Pullman green. The belt rail is royal blue with gilt letters reading "Baltimore & Ohio Train Connection." The window posts, hood top and wheel disks are of a light off-shade of green and the roof, fenders and hubs are black.

Stations Richly Furnished, and Dignified

Having picked the locations of the permanent stations, plans were then effectuated for equipping them. In order to put the service on as high a plane as possible, the appointments were made as complete as possible, and an air of richness as well as quiet dignity striven for. It was and is the constant aim to maintain the highest standards and prevent any blatant advertising or appearances in any direction.

These stations are equipped with the best furniture possible to secure, comfortable chairs, splendid hangings and rugs and quiet and mellow lighting arrangements. All the necessary ticket racks, etc., were installed, but out of sight. Men's and women's rest rooms, maids and uniformed porters in addition to the ticketing forces were provided.

One of the questions which immediately arose when it was decided to use motor coaches was just how were passengers to be transferred between trains and coaches. It was apparent, of course, that they must be handled in motor coaches from Jersey City via ferryboats to Manhattan, and it immediately became apparent that they should be able to step directly from the trains to the motor coaches or vice versa.

To accomplish that purpose, the Central of New Jersey assigned two tracks definitely for use of Baltimore & Ohio trains, and the tracks between were taken up and replaced by a broad roadway.

This permits the motor coaches to be placed in position directly beside the trains so passengers can make the transfer with a minimum effort. The coaches are spotted beside the train in such positions as to require a minimum effort on part of passengers in passing to or from them.

When this portion of the operating procedure had been solved consideration then had to be given the handling of the motor coaches on the ferryboats so that the comfort and safety of passengers be absolutely safeguarded. Arrangements were made so that unless it is absolutely impossible (and that is rarely so) motor coaches be placed on the aprons so as to be out in the open. This for the double purpose of giving those who elect to remain in the coaches for the boat trip a clear view of the New York skyline, and to assure light and fresher air than would be possible if the coaches were in the interior of the boats.

To further insure safety and comfort, additional

chocks were placed on the boats chained to their sides so that they could be placed under the wheels to prevent movement. Instructions were issued to operators to stop their engines immediately upon coming to rest on boats, place cars in the proper gear to further prevent movement, set their brakes, keep their tail lights burning, and they themselves instructed not to leave their places behind the wheel. Other vehicles are not permitted within a certain distance, I think 10 ft., of the coaches, and the coaches are not permitted to exceed specified speeds in moving on or off the boats. No doors are permitted to be opened until the coaches are completely at rest. After that time passengers are informed that they may leave the coaches if they desire to move about the boat, but told at what time they are to be back in their seats.

Arrangements Made En Route

with Inbound Passengers

The train conductor canvasses the train before reaching Philadelphia, to determine the number of New York passengers aboard. This information is telegraphed to New York so that sufficient motor coach equipment will be available. After leaving Philadelphia additional information is forwarded so that if any change in plans is necessary, such change can be made. At Philadelphia a train attendant boards the train, and proceeds to interview every New York passenger. He gets his New York destination from him and then tells him the proper coach route to use, whether the Twenty-third street route, Liberty street route or Brooklyn route. He tags his baggage showing the proper coach and issues a stub which indicates the route and also shows the coach number. The latter procedure is to assure that the passenger and his baggage get on the same coach. Different color tags are used for each route so that porters can properly identify and handle baggage.

Immediately the train comes to a stop the station porters take the baggage from the train and distribute to the coaches shown on the baggage tags, the passengers proceeding direct to the motor coaches with no delay and no concern as to their belongings. Before boarding the coach they present the stub given by the train attendant to the coach attendant, which insures that they are on proper motor coach. A force of station attendants is also present to assist the passengers if any are uncertain as to their proper movements. The motor coaches then go to their places on ferryboats and on arrival on the Manhattan side continue on their routes making the scheduled stops. At all hotel or other stops, other than the final station stops, the coach attendant handles their baggage from the coaches placing it in the possession of passengers or hotel or other porters as they may desire. This service is, of course, performed without cost to the passenger, he being relieved of the necessity of tipping porters, paying taxi fares, etc.

Extra Conveniences for Passengers

Any passenger who for any reason desires to remain only for the day in New York, may check his bags at one of the regular stations, without charge, and either call for it later or if he is nearer to another one of our stations, when he desires to leave New York, he may telephone the station at which the baggage was left, giving the check number, and the baggage will be sent to Jersey City where he will find it beside his train on his arrival. In the case of a Pullman passenger, if he telephones his seat or berth number, he will find his baggage in his berth or beside his seat when he reaches the out-bound train. With respect to outbound passengers the general method is the same. They may check their

baggage at stations at any time and it will be sent to their proper place on the train. They may purchase tickets at the regular stations and board motor coaches there, or they may board them at the other scheduled stops. If a passenger does board a motor coach at one of these points without having purchased a ticket, one dollar is collected from him by the coach attendant, a receipt being given therefor. This receipt is accepted by the train conductor as having a value of one dollar when applied to the purchase of a ticket to some point on the Baltimore & Ohio. This is to prevent any, other than bona-fide passengers from riding the motor coaches.

One of the advantages of the system is the fact that passengers are to all intents and purposes on the train as soon as they board the coach. This is because trains always wait the arrival of the coaches. So far, to my knowledge, the record has been perfect, that is, the coaches have always made the ferryboat they were scheduled to make. However, in the event that an accident should occur, serious enough to cause material delay to the motor coach the attendants have instructions to secure taxi cabs from any source and forward passengers in them, giving proper authorization slips which are honored by ticket agents as designated points.

In order that passengers may be thoroughly acquainted with the stops, our schedules have been prepared in such a way that both the place and time of all regular stops is shown. These schedules were prepared with great care and made conservatively so that there be no question of their maintenance. We have had enough experience now so that it is possible to know exactly what we can do in future.

The Fifth Avenue Coach Company provided a new garage to take care of this equipment and carefully organized a trained corps of operators, attendants, supervisors and dispatchers who are the finest set of men it has been my privilege to see in work of this sort. Before the operation was started these men were picked and classes were held at which they were taught and drilled in the details for which they were responsible. Before operations started, dress rehearsals were held, that is, coaches were run over the routes and all the details of operation were performed.

Will Similar Service Be Offered Elsewhere?

We feel that a creditable piece of work has been done in the establishment of the service I have described. We also feel that all the things we have done are necessary for a service of this particular character, and for that reason I have described them. It is an innovation in terminal motor coach operation, gives a pleasing service to patrons, removes the annoyances occasioned by the employment of porters and walks through passenger stations to taxi lines, eliminates the so frequent scramble for taxis, dissipates baggage worries, eliminates necessity for tips, and in general has many attractive features not heretofore available to patrons. The Baltimore & Ohio takes pride in the fact that it is the leader in the establishment of such service and is pleased at the results attained. Those results are best illustrated by the fact that we started the New York service with 10 motor coaches and today are operating 22 exclusive of two running between Newark and Elizabeth. As to the future, and possibility of other installations, no one can tell. With increasing interest in the use of motor coaches, higher land values in the business districts of large cities and traffic congestion about main passenger stations in those districts, it seems probable that the idea of motor coach transportation of passengers from stations in outlying sections of communities when there are physical or other reasons for it, will go on.

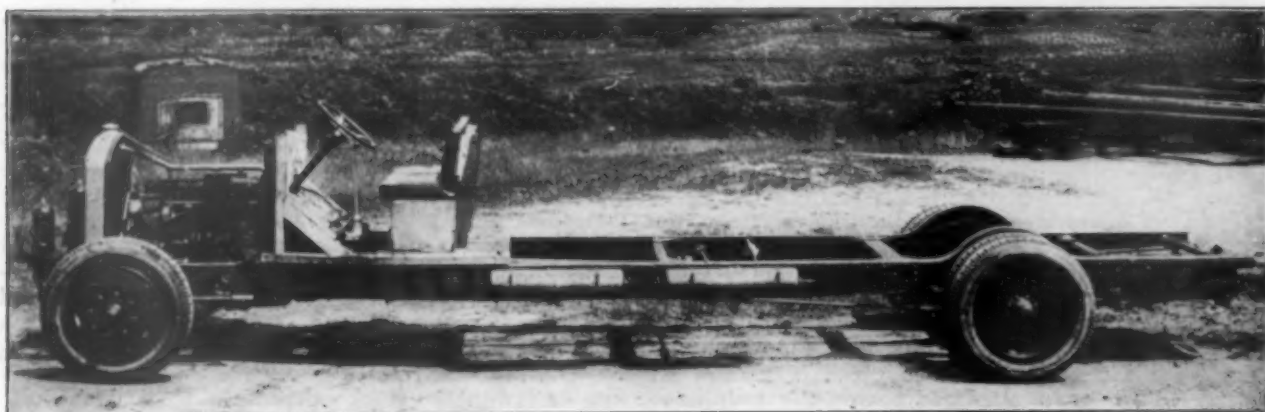
Northern Ohio P. & L. Company Builds Own Bus

A MOTOR bus designed to negotiate the hills of Akron, Ohio, in high gear has been designed and built in the shops of the Northern Ohio Power & Light Company, Akron. It has not been determined whether the bus will be produced in quantity for the

Bosch magneto in place of the battery system of ignition.

The rear axle is a double-reduction type, fitted with herring-bone gears, and has a road clearance of nine inches, which is unusually high.

The chassis has a 9¾-in. pressed channel frame, tied together partly by tubular members and partly by channel members. The rear springs are of the two-stage type, the front springs being anchored at the rear with a flexible shackle and connecting with the shock ab-



The Northern Ohio Chassis

use of the Northern Ohio Company. The bus is being exhibited at the American Railway Association at Cleveland, Ohio, on October 4-8, in connection with the annual convention of that association.

The bus, which was designed by P. V. C. See, superintendent of equipment, was built in the company's shops at Kenmore, Ohio, at a cost said to be considerably below the average price paid by the company for buses.

sorbers in front. Air shock absorbers are fitted to the chassis.

A steel and ply-metal body is being manufactured by the Kuhlman Body Company, Cleveland, Ohio. It will be fitted with seats for 29 passengers, the seats being covered with leather.

THE UNION PACIFIC has filed an application with the department of public works of Oregon for a permit to operate motor buses for passenger and express service between Walla Walla, Wash., and Yakima, a distance of approximately 125 miles. The buses will connect with all trains at terminal points and will use railway stations. This bus service is designed to replace the present rail motor car service operating between Walla Walla and Yakima.



The Chassis was Designed and Built in the Company's Shops

The bus weighs slightly more than 11,000 lbs., complete. The motor is a Waukesha type 6-A, developing 115 hp. at 1,800 revolutions a minute. It is equipped with an air filter system. The motor also has a Robert



Interior of the B. & M.'s Boston Garage

North Carolina Operates Road Test Truck*

By H. B. Shaw

Director, Engineering Experiment Station, North Carolina State College.

IN their road-test truck, the North Carolina State Highway Commission and the Engineering Experiment Station of North Carolina State College have a valuable device for measuring the power required to drive motor vehicles on all sorts and conditions of road. The unique feature of this test vehicle may be stated briefly as follows:

1. It has an electric drive superimposed upon the usual mechanical drive.

2. The motors are series wound, of the railway or battery vehicle type. The electric generator also is series wound, which is unusual.

3. Instantaneous and average values of speed and of the electric current in the single main circuit are determined independently. From them, the power delivered to the vehicle mechanism is easily calculated.

4. The road-test truck, at specific speeds, measures the average power instead of the tractive resistance. The latter, however, may be calculated from the power, speed, and mechanical efficiency.

5. The vehicle contains a specially constructed "anti-vibration" suspension for the graphic instruments, voiding the effects of the vehicle vibrations, tilts, and jars.

6. An ampere-hour meter and the elapsed time are used to get the average value of the electric current for a run, instead of averaging the current from the charts of the recording ammeter. This saves much time.

The test vehicle is operated at a selected speed which, for accurate measurements, must be kept constant during a run. It requires some practice to keep the speed constant by manipulation of the throttle of the gasoline engine. The speed commonly used for test runs is 15 miles per hour, though tests have been made at speeds as low as 2 miles per hour and as high as 30 miles per hour.

A feature of this electric drive is that it does not retard the vehicle motion downhill nor will the vehicle measure the power when none is required, as when coasting. Consequently, the brakes have to be used to hold the speed constant on heavy down grades.

* From the Highway Research News, August, 1926.

The vehicle will measure the power at different speeds on hilly roads, the power to pull through mud, sand, etc. To get the comparative horsepower on different road surfaces it is preferable to select fairly level roads and avoid the necessity of calculating and eliminating the effect of grades.

A large number of test runs on a race track showed, at 15 miles per hour, the following results as to horsepower required:

10.30 horsepower when the surface was wet.

9.30 horsepower when the surface was partially dried.

8.50 horsepower when the surface was nearly dry and somewhat rough.

5.17 horsepower when the surface was in the best of conditions, dry and fairly smooth.

The effect of the speed of the truck upon the horsepower required when the race track was in the best condition is shown by the following results:

At a speed of 2½ miles per hour, 0.67 horsepower.

At a speed of 5 miles per hour, 1.40 horsepower.

At a speed of 10 miles per hour, 3.10 horsepower.

At a speed of 15 miles per hour, 5.17 horsepower.

At a speed of 20 miles per hour, 8.10 horsepower.

At a speed of 25 miles per hour, 12.45 horsepower.

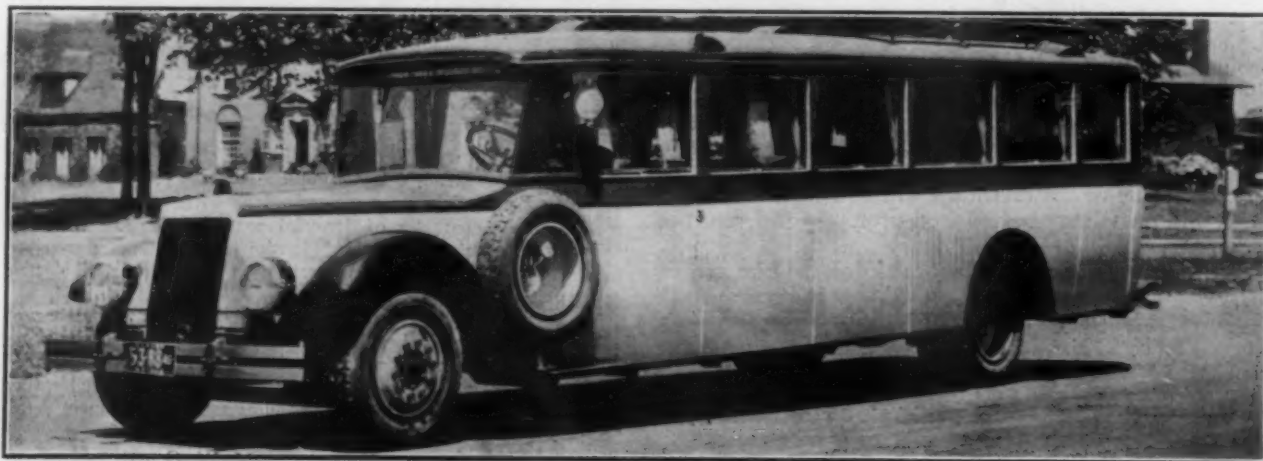
At a speed of 30 miles per hour, 19.00 horsepower.

Analysis of the internal losses, analysis of tractive resistance, recalibration, and study of all the functioning of the test vehicle are now being made. The measurements are sufficiently delicate to permit very accurate adjustment of brakes, tests of the effect of different lubricants upon power losses, etc.

When the present laboratory investigations are completed, the test runs are to be resumed and continued for at least a year in order to get all-year, all-weather comparative horsepower for different road surfaces.

The further intention is to use the comparative horsepower as a basis for getting the difference in mileage costs for gasoline, tires, and maintenance resulting from operation on different road surfaces. Neglecting other savings in cost due to hard-surfaced roads, the differences in cost per ton-mile for tires, gasoline, and maintenance can be taken as the differences in cost per ton-mile for different road surfaces, and used to determine the economy of highways.

The results are expected to demonstrate quantitatively the volume of traffic at which expenditures for first class highways are economically justified, through saving more in cost of vehicle operation than the additional annual cost of the improved highway.



The New Mack 6-Cylinder Parlor Car

Standardization of Equipment*

By G. T. Seely

Vice-President, Chicago Motor Coach Company

A SURVEY of a large number of bus operations in various parts of the country leads one to the conclusion that in the present stage of bus development two very important considerations are:

First: Standardization of equipment on the smallest possible number of types and makes.

Second: Establishment of a standard of maintenance as nearly as possible 100 per cent perfect.

The principal development of bus operation from now on will be the merging of small operations conducted by individuals or very small companies into larger systems; the growth of existing systems as the territories through which the lines are operated are developed; and the replacement in many instances of unprofitable electric railway and steam railway passenger service by bus operation.

From my observation, I believe that standardization is not considered in 75 per cent of the purchases of bus equipment. I have seen examples of as many as eight different makes of buses in fleets of from 100 to 200 buses, and this variety was not caused by the acquisition of operating companies, but by direct purchase of new equipment. The decision as to the make of bus is made in many instances by the financial heads because of interlocking directorates, power customers, freight consignments by big manufacturers, political favors done by local representatives of manufacturers, acceptance of stock in payment for commissions, and like reasons.

The effect of non-standardization is far-reaching and affects not only costs of maintenance and operation, but efficiency of maintenance, efficiency in service rendered, and passenger revenue.

A variegated assortment of buses on a line affords a bad appearance. Passengers will naturally prefer one type of bus to another, and will be dissatisfied if they have to use the poorer buses, or wait until the bus they prefer reaches them.

Maintenance Made Difficult

Assume a company is operating 100 buses of six different makes, from three garages. It is very likely that no one garage will house buses exclusively of one kind. As many as three types may be in one garage. This necessitates a supply of repair parts for each type in the operating garage. In the main repair shop a more complete stock of parts for each make of bus must be kept. Unless a very large amount of money is invested in a complete stock of parts for each type of equipment, the storekeeper will only keep a stock of such parts as are used most often. Many times, buses will be kept in the garage for one or two weeks waiting for some part that has failed, and is not in stock. If the entire installation is of one make of bus, a complete stock of parts can be kept, including such parts as fail only occasionally, the value of the inventory will be kept at the minimum and buses may be repaired promptly and returned to service.

The efficiency of the mechanical forces will be greatly increased if one type of bus is used. Men become more proficient when they do the same thing over and over. Special tools will be devised to expedite the removal and replacement of certain parts. Each make of bus has its peculiar difficulties, and long acquaintance will enable a man to make repairs more quickly, and also to foresee and obviate failures.

*From a paper read at the meeting of the Society of Automotive Engineers, Boston, Mass., November 16.

It is only natural that the most dependable type of bus will be favored and better cared for, and the poorer will be neglected. The men repairing the poorer bus will become discouraged, and the efficiency and morale of the whole department will be lowered. Difficulties will be magnified, and the whole organization will become imbued with the idea that one particular type of bus is no good, while the fact may be that if the whole attention of the maintenance force were to be directed to this type of bus, it would operate satisfactorily.

Effect on Drivers

An important factor is the effect on the operating personnel where a number of types of buses are in operation. The drivers will naturally prefer the better type of equipment. If they are obliged to use a type which they do not like, they will report imaginary difficulties, turn a bus in for insignificant defects, and, in some cases, temporarily put out of order bell signals, ignition, etc., so that they will not be obliged to operate the bus they dislike.

The facts mentioned above will be very evident to any operating man who studies his own buses, or those of neighboring companies.

A careful study should be made by each company to determine the type of bus that gives the best satisfaction under its own operating conditions. After a selection is made, all additions to their fleet should be of the same type. The number of buses in reserve over and above those required for actual operating schedules should be sufficient not only to maintain the equipment properly, but also to supply any sudden demand for increased service, so that it will not be necessary in emergencies to purchase whatever type of equipment can be picked up immediately. Many times, the type of bus that can be secured overnight is of a type that is not satisfactory, and that is the reason for one's being able to acquire it so quickly.

A Communication

By A. E. R. A.

PITTSBURGH, Pa.

TO THE EDITOR:

In the Motor Transport Section of November 27 is an editorial entitled, "Uniform Accounting for Bus Companies." This editorial is slightly misleading in that it states that these classifications were designed "principally" for the use of independent bus operators not previously acquainted with the keeping of accounts used in the transportation business. The classifications adopted at the Asheville convention of the National Association of Railway and Utilities Commissioners are the same in every respect as those that had been previously prepared by the Committee on Bus Accounting of the American Electric Railway Accountants' Association and which have been adopted by that association.

These classifications were prepared primarily for the use of electric railway companies operating buses, either directly or through subsidiaries. The value of these classifications to other motor carriers was not lost sight of in their preparation. The accounting procedure was recognized as being the same, irrespective of the character of financial control. The classifications follow the principles contained in the classifications prescribed by the Interstate Commerce Commission for the use of electric railways.

To date these classifications are used by a large number of railway companies in keeping the costs of their bus operations. A number of regulatory commissions have likewise approved them. In general, it can be said that they have received rather broad usage. Just how many companies are using them in detail is difficult to determine but there are several hundred.

M. W. GLOVER,

Chairman, Committee on Bus Accounting, American Electric Railway Accountants' Association.

Motor Transport News

THE PENNSYLVANIA has established, under contract, an additional highway freight service route between Carnegie, Pa., and Burgettstown, 15 miles.

"RAILWAYS will be forced to go into the motor truck business to get any of the less-than-carload haulage within a distance of 100 miles," says H. E. Everhart, assistant general freight agent of the Gulf, Colorado & Santa Fe.

HIGHWAY OFFICIALS in 36 "snow states" report a program of open roads for the snow season of 1926-27, aggregating 92,756 miles. The expenses for snow removal work last winter, when approximately the same mileage was kept open, were approximately \$4,000,000.

ALTHOUGH no official announcement has been made, it is understood that the first bus line to be established by the Jersey Central Transportation Company, bus operating subsidiary of the Central of New Jersey, will extend from Lakewood, N. J., to Toms river and Barnegat.

EXTENSION of its service to Glacier National Park, Montana, will be effected by the Chicago, Milwaukee & St. Paul next summer through a contract with the Y. G. Bus Line, under which bus service will be provided from Great Falls, Mont., to Glacier Park station. One trip will be made in each direction daily, connecting with through trains on the St. Paul.

A TRI-WEEKLY BUS TOUR in the vicinity of Death Valley, Cal., will be operated by the Union Pacific between February 1 and May 15. The buses will operate from Death Valley Junction, Cal., to which a through sleeping car will be carried on the Continental limited. The tour will be on an all-expense basis, tourists being accommodated at a recently erected hotel. Eleven passenger buses will be used.

THE DENVER & INTERURBAN TRANSPORTATION COMPANY, bus operating subsidiary of the Colorado & Southern, which is now operating buses between Denver, Colo., and Boulder, has applied to the Colorado Public Utilities Commission for permission to operate a bus line via Louisville, Colo., and Eldorado Springs. These points were left without transportation service when the electric line of the Denver & Interurban was abandoned.

THE BOSTON & MAINE TRANSPORTATION COMPANY has applied for authority to establish motor bus service between Lowell, Mass., and Worcester via Ayer and Clinton. The proposed route will provide more frequent service than is possible by train and, by making Lowell the point of connection for Montreal trains for passengers from Worcester and other communities en route, will effect a further improved convenience. Parlor type buses will be used.

MORE HIGHWAY ACCIDENTS occur between the hours of 5:00 p. m. and 6:00 p. m. than during any other part of the day, according to a compilation of reports of more than 1,000 fatal motor accidents reported to the National Automobile Chamber of Commerce in 1926 by newspapers throughout the country. Of the total of 1,107 cases tabulated, 116 occurred between the hours of 5:00 p. m. and 6:00 p. m. and 109 between the hours of 7:00 p. m. and 8:00 p. m. During the first 11 months of 1926, in cases where physical conditions were a major factor in causing accidents, these were due in 102 cases to fog, snow or rain, in 56 cases to defects in the vehicles and in 35 cases to skidding.

A BILL placing all bus lines operating in the state of Missouri under the control of the Missouri Public Service Commission and granting that body the authority to refuse permission to operate to bus lines where in its opinion, territories are properly served by railways, has been prepared for early introduction into the Missouri General Assembly. The bill provides for regulation of the bus lines as public utilities, supervising the schedules, routes and rates. One clause of the bill would empower the commission to refuse to permit a bus line to continue to operate regardless of how long it might have been in existence

if the commission should decide that a continuation of the bus service was not necessary for the good of the public. The bill also provides for the payment of fees by buses, ranging from \$20 to \$150 per annum depending on their capacity.

A Correction

In the December Motor Transport Section, in reporting the Chicago meeting of the Railroad Motor Transport Conference, R. N. Van Doren, vice-president and general counsel of the Chicago & Northwestern, who addressed the meeting, was, through a typographical error, referred to as occupying that position on the Chicago and Eastern Illinois.

Colorado Commission Warns

Against Irresponsible Independents

The Colorado Public Utilities Commission has issued a warning to the traveling public to make sure of the financial responsibility of bus lines operating between widely separated cities before patronizing them. As a case in point, the commission disclosed that a short time ago a number of passengers arrived in Denver, Colo., en route in a motor bus from Los Angeles, Cal., to Omaha, Neb. A long stop of about three days was made in Denver and when the passengers objected they were informed by the driver that he could go no farther unless the company provided more money.

Bus Competition with Santa Fe

in Arizona Disapproved

The Arizona Corporation Commission has denied certificates to two applying bus lines for permission to operate buses in competition with the Atchison, Topeka & Santa Fe, through the territory near Grand Canyon, Ariz., and between Phoenix, Ariz., and Prescott. In its decision the commission recognized that the Santa Fe's service on its rails is adequate and pointed out, in the case of the proposed Grand Canyon bus line, that this region has been developed through the efforts and expense of the Santa Fe and for this reason that it should continue to retain its monopoly of transportation.

New England Gets Exclusive

Right to Route Formerly Shared

According to an agreement between the New England Transportation Company, subsidiary of the New York, New Haven and Hartford, and the Interstate Buses Corporation, the latter has surrendered all rights of the Providence, R. I., to Hartford, Conn., via Danielson and Willimantic route, heretofore shared by it with the railroad bus company.

Beginning January 5, the New England Transportation Company announced, a new schedule, including four round-trips between Providence and Hartford and one additional trip between Providence and Danielson.

Railroad Applies for Motor Bus

Franchise in Porto Rico

A Porto Rican railroad company has petitioned the Public Service Commission of that country for an exclusive franchise to operate motor bus lines on highways parallel to its rail lines, and in cities and towns through which these lines pass, states Assistant Trade Commissioner J. R. McKey, San Juan, in a report to the Department of Commerce. It purposes, upon the establishment of this motor service, greatly to reduce its passenger train service. The company operates a little over 200 miles of main line and about 20 miles of branch line, touching nearly all of the cities and towns of importance on the coastal plain around the Island. Its main line out of San Juan traverses the neck of the peninsula between the old city and the new suburbs, parallel to the highways traveled by not only all of the buses operating within the city, but those operating inter-urban out of San Juan.

At present approximately 281 motor buses are operating in the Island, the largest number used by one operating concern being 30. This company and five others operate 57 buses in

San Juan. In addition, about 97 buses are being run in the city by individuals or companies each having only 1 or 2 vehicles. About 78 enterprises, operating some 127 vehicles, provide interurban service. The franchise sought would, apparently, affect not only the operators in San Juan, but probably at least 50 or 60 per cent of those providing interurban service, or service in cities other than San Juan. These operators are preparing to present strong opposition to the granting of the franchise.

Statistics of the Passenger Motor Transport Industry

A report issued by the Bus division of the American Automobile Association gives the following figures showing the status of the common carrier bus industry at the close of 1926:

	Estimated buses operated 1926	Estimated valuation 1926
Intrastate motor carriers.....	32,000	\$192,000,000
Interstate motor carriers.....	2,000	12,000,000
Electric railways and subsidiaries.....	6,100	33,500,000
Steam railroads and subsidiaries.....	500	3,500,000
Total.....	40,600	241,000,000
Estimated total miles of route operated all common carriers.....		300,000
Estimated total bus miles all common carriers.....		1,900,000,000
Estimated total passenger miles all common carriers.....		15,200,000,000
Estimated total passenger revenue all common carriers.....		\$608,000,000.00
Estimated average revenue per passenger mile.....		\$0.04
Estimated average revenue per bus mile.....		\$0.32

Interstate Operator Competing with Railroad Not Allowed to Operate Intrastate

An independent bus operator doing an interstate business between the New Jersey Communities of Maplewood, Orange and East Orange, seeking the approval of the New Jersey Board of Public Utility Commissioners to become an intrastate carrier by operating only between the three communities mentioned above and Jersey City has had its application denied.

The New Jersey territory served by this line is in the Delaware, Lackawanna & Western suburban zone. The bus operator desired to establish the Jersey City terminus (at the Journal Square station of the Hudson and Manhattan tubes), apparently, to avoid the ferry trip to New York.

The commission, in finding adversely, said in part:

"The railroad company provides passenger train service between Maplewood, South Orange, Orange, East Orange, Newark, Harrison and Hoboken. At the Hoboken terminal passengers may travel via tube to Journal square and New York.

"It does not appear that, at the present time, there is such community of interests between Jersey City and the other New Jersey municipalities as to require additional transportation facilities. It is evident that if it were not for the fact that passengers may take the tube trains at Journal square for New York the petitioner would not undertake the bus operation. As incidental to rather than the main object of the operation it is proposed to transact local business between the bus termini.

"Failure to approve the local consents will not deprive the petitioner of any right not now possessed by him to conduct a

through transportation business to and from New York. It may be that there would be a saving to the operator if the buses ran to Journal square only, leaving the passengers to continue by tube trains to New York, and it may be also that some of the through passengers using the buses would prefer to change at Journal square than continue their trips by bus to New York.

"If it appeared that the train service afforded to the terminal at Hoboken failed to provide a convenient method of transportation for those desiring to connect with tube trains for New York, or that there is a demand for additional trains which the railroad is unwilling to supply, the operation of buses to the station at Journal square would be justified. But these conditions do not appear to exist. Nor does it appear that those living along the Lackawanna who would take buses to Journal square and who have no intention of taking trains from the tube station there are subjected to a material disadvantage because such buses are not operated. Tube trains from the railway terminal are run at frequent intervals, connecting with trains for Journal square.

"The fact that the present bus route to New York City is largely patronized is not evidence that there is a community of interest between Journal square and the other municipalities in New Jersey which would make necessary the proposed operation.

"The effect of the proposed route is to superimpose on all the numerous existing facilities a service that is now adequately handled by such facilities."

Orders for Equipment

THE CHICAGO & ALTON has ordered two eight-wheel Versare highway coaches from the Versare Corporation, Albany, N. Y. This equipment will be used on the second Alton bus line extending from Springfield, Ill., to Joliet. The Alton now has four Versare coaches.

Motor Transport Officers

G. E. Sick will henceforth have charge of motorization studies, installation and supervision on the Central region of the Pennsylvania. G. F. Dell will perform similar duties on the Eastern region.

Among the Manufacturers

D. A. Andrews, service manager of the Continental Motors Corporation, Detroit, Mich., has been promoted to assistant sales manager.

The Cleveland Tanning Company, Cleveland, Ohio, has announced the origination and production of a new grade of leather called Cletan. This leather is particularly adapted to railroad car and motor coach upholstery. It is said not to be affected by heat, cold or moisture, and can be produced in any color combination.



Garford Buses in Service in Cincinnati

